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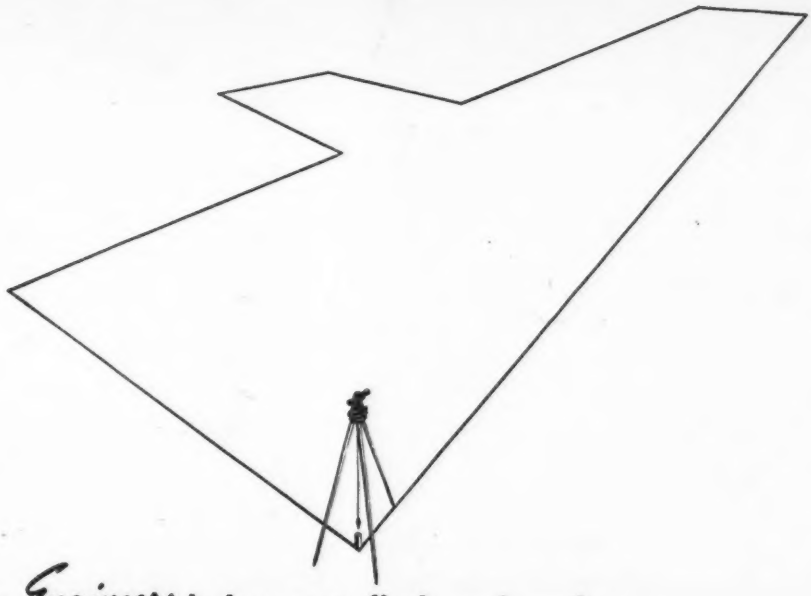
VOLUME 126, No. 16 APRIL 15, 1948



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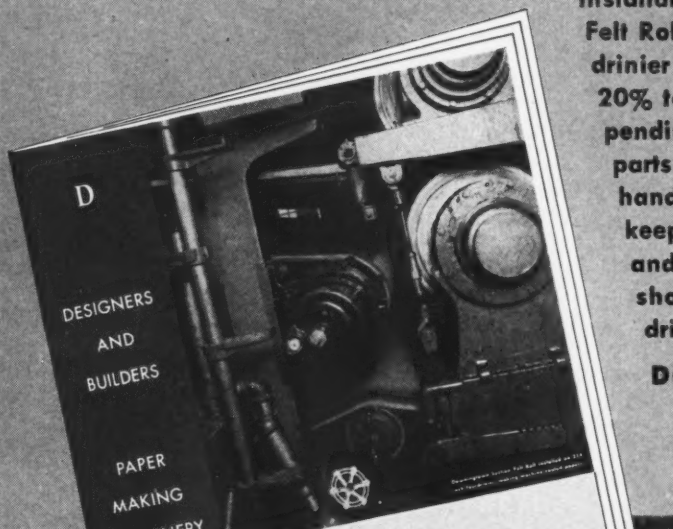

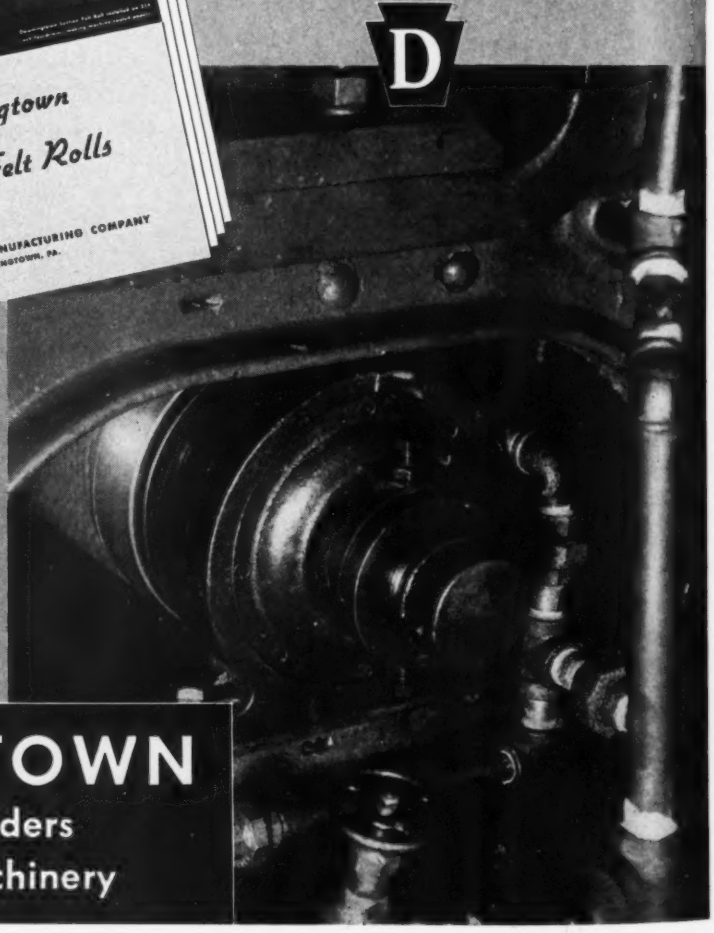

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Paper TRADE JOURNAL

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CALENDAR OF COMING EVENTS

April 28-29—National Paperboard Association Spring Meeting, Seaview Country Club, Absecon, N. J.

May 9-12—National Paper Box Manufacturers Association, Annual Convention, Cincinnati, O.

May 19, 20, 21, 1948—American Pulp and Paper Mill Superintendents Association, Annual Meeting, Roosevelt Hotel, New Orleans, La.

June 11-12, 1948—Paper & Twine Association, Annual Convention, French Lick Springs, Indiana.

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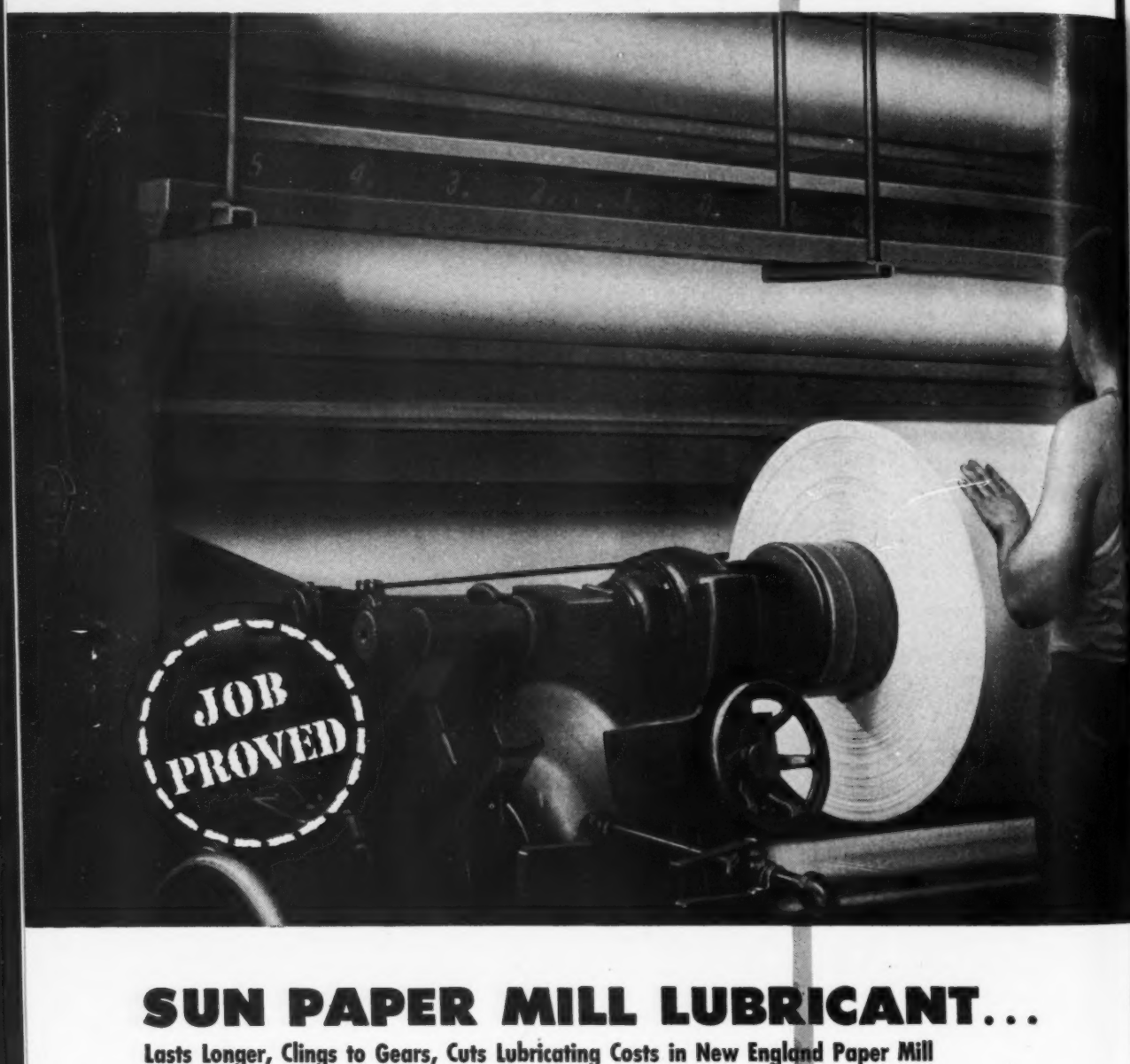

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Lasts Longer, Clings to Gears, Cuts Lubricating Costs in New England Paper Mill

A large New England paper mill was using another oil company's lubricant on the bevel gears and spur gears of various paper machines. As results were far from satisfactory, a Sun Engineer was called in.

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Paper TRADE JOURNAL

VOLUME 126, NO. 16 REG. U.S. PAT. OFF. APRIL 15, 1948

Newsprint Production Hits New March High

NEW YORK — Newsprint production in Canada during March 1948, according to the News Print Service Bureau, amounted to 387,672 tons. Shipments from these mills amounted to 380,732 tons. Production in the United States was 64,894 tons and shipments were 65,943 tons. The output in Newfoundland was 28,510 tons and shipments were 22,522 tons making a total North American production of 481,076 tons and shipments of 469,197 tons. This compares with continental production of 472,341 tons and shipments of 465,990 tons in March 1947. North American production in March 1948 exceeded that of any March on record.

The Canadian mills produced 20,204 tons more in the first three months of 1948 than in the first three months of 1947, which was an increase of 1.9 percent. The output in the United States was 11,348 tons or 5.7 percent below that in the first three months of 1947; in Newfoundland production was 12,396 tons or 13.2 percent less, making a net decrease of 3,540 tons, or 0.3 percent less than 1947's first three months.

Stocks of newsprint at the end of March were 88,704 tons at Canadian mills, 6,306 tons at United States mills, and 64,467 tons at Newfoundland mills, making a combined total of 159,477 tons compared with 147,598 tons on February 29, 1948, and 228,996 tons at the end of March 1947.

Bizonia Buys Polish Newsprint

WASHINGTON — Approximately 300 tons of newsprint valued at $57,600 were scheduled for delivery into the American-British bizonal area of Germany in February, under a contract with Poland, according to an official despatch to this country. Negotiations were reported under way for an additional 900 tons at the same price, to be shipped in monthly increments of 300 tons, it was added. The unit price specified was $192 a ton for delivery at Gydnia. The report did not confirm that delivery had been made.

Senate Confirms McCabe

WASHINGTON—Thomas B. McCabe, president of the Scott Paper Company, was confirmed this week by the Senate as chairman of the Federal Reserve Board. His term is to expire February 1, 1956.

N. P. T. A. Elects Ralph Luff At Busy New York Session

Wisconsin Payrolls Give More to Fewer

MADISON, Wis.—A reduction of 0.5 percent in the number of employes working in Wisconsin plants producing paper and allied products was shown during February as compared with the previous month, according to the Wisconsin Industrial Commission. There were 28,300 employes in February against 28,400 in January, the report showed. Payrolls, however, showed an increase of 0.17 percent during the same period. The estimated weekly payrolls during February amounted to $1,632,000, while in January the total was $1,621,000.

Average weekly hours worked were 44.4, and the average hourly earnings were $1.297.

Twenty manufacturers of paper and allied products in Milwaukee county reported 3,319 employes during February, a decline of 1.2 percent. Payrolls in these plants aggregated $189,485, a decline of 1.5 percent when compared with January. The average working week also consisted of 44.4 hours. Average hourly earnings amounted to $1.284.

RALPH G. LUFF
Heads N.P.T.A.

NEW YORK—Its big annual convention high-lighted by a stimulating talk from the president of the American Paper and Pulp Association, Cola G. Parker, the National Paper Trade Association brought its meetings to a close here late last week.

Ralph G. Luff was elected president of the National Paper Trade Association on April 7th when the paper merchants held their annual convention at the Waldorf-Astoria in New York. Mr. Luff, president of the D. L. Ward Company, Philadelphia, has been vice-president representing the Wrapping Paper Division of the Association for the past two years, and succeeds Arthur W. Towne of Blake, Moffitt & Towne, San Francisco.

Ralph Luff has been closely affiliated with the paper industry since 1917 when he joined the D. L. Ward Company as credit manager. In turn, he became assistant treasurer, then treasurer; resigning the latter position in 1924 to accept the sales managership of the Coarse Paper Division. In 1937 he was made executive vice-president of the organization.

July, 1941, Ralph G. Luff became president of the D. L. Ward Company. Since then, he has also been president of the Philadelphia Paper Trade Association three consecutive terms.

Mr. Parker, in his address, provided the convention with a studied view of the paper industry's future as he sees it from information gathered close at the source.

As is the case with all industries, there are two groups of forces which affect the demand and supply balance in the paper industry. First, are the forces which impinge on and control general business (they are our customers). Second, are the forces relating specifically to conditions within the industry. The first group is associated with and determines the demand for paper, while the second more generally is associated with the production and therefore supply of paper.

It seems to me that there is a third force in the case of our industry which could often be (and over a long time is) of peculiar significance as in no other industry that readily occurs to mind. This force has two facets, one affecting fine papers and the other,

(Continued on page 24)

Reese Tells Local of Manufacturing Costs

WISCONSIN RAPIDS, Wis. — C. H. Roose, vice-president of manufacturing at Nekoosa-Edwards Paper Company, addressed local 52, Pulp and Sulphite Workers, last week in the Nekoosa-Port Edwards labor temple. Mr. Reese explained to the workers the various factors that enter into the cost of manufacturing and also the necessity of progressing to meet growing competition. He talked of the availability of suitable woods and how it was often necesary to transport wood from great distances.

Mr. Rees said the company has plans for expending some million and a half dollars during 1948 for improvements and expansion in both the Nekoosa and Port Edwards mills as part of the campaign to meet market competition.

He showed the workers an interesting display of about 50 different kinds of finished and printed papers. In conclusion, Reese expressed the company's appreciation of the workers' loyalty and the part they play in building up Nepco products.

Sensenbrenner Draws Sobering Picture

NEENAH, Wis.—A world outlook as dark as it was in 1939 was envisioned April 7 by F. J. Sensenbrenner, former president of Kimberly-Clark Corporation, in a talk before the Neenah Kiwanis club. He declared that all Americans should take the responsibility of citizenship and assume an active part in civic and government affairs.

Most of his address was devoted to an explanation of the expanding services of the University of Wisconsin. Mr. Sensenbrenner is chairman of the board of regents. He said that the University offers its services not only to the student population but has an expanding program to help farmers, business and professional men through specialized institutes.

Mathieson Chemical Elects Nichols President

NEW YORK—The board of directors of Mathieson Chemical Corporation (formerly The Mathieson Alkali Works) last week elected Thomas S. Nichols as president and chief executive officer. George W. Dolan, formerly president, was elected chairman of the board. A. U. Fox, former chairman, resigned. John C. Leppart was elected vice-president.

Officers re-elected are A. T. Bennett, vice-president-general manager of operations; Howard Berry, vice-president and treasurer; D. W. Drummond, vice-president-general manager of sales; J. V. Joyce, vice-president and comptroller; E. E. Routh, vice-president-director of sales; and A. P. Winsor, secretary.

A. F. G. RAIKES

who has been named assistant director of sales in the St. Louis General Sales Office of Bemis Bro. Bag Company by Homer V. Howes, Bemis vice-president and director of sales. Mr. Raikes joined hte Bemis organization in 1938 as a member of the Kansas City sales force and was transferred to the general sales office in St. Louis one year later.

Prior to joining Bemis, Mr. Raikes spent ten years on the staff of The Northwestern Miller, flour milling trade magazine, and two years with the Mississippi Valley Trust Company in St. Louis. A graduate of the Royal Military College, Sandhurst, England, Mr. Raikes served four years as an officer with the British Army in Europe during World War I and was with the British Indian Army from 1918 to 1925.

Werden Heads N. Y. Sales For United Board & Carton

NEW YORK—United Board & Carton Corporation has appointed Edwin S. Werden to be district sales manager for the New York territory. Mr. Werden has been active in the packaging field since his graduation from New York University in 1927. For the past seven years he has been connected with the Empire Box Corporation. Previous to that he was with the General Glass Corporation, now the Anchor-Hocking Glass Corporation.

Semple to Head N. E. Sales

NEW YORK — William O. (Bill) Semple has been appointed district sales manager for the New England territory by United Board & Carton Corporation. A well known figure in paper jobber circles, Bill Semple received his first sales training in the drug field. After entering the paper business he worked for Dixie Cup, where he helped to introduce the first packaged cups in color. From Dixie Mr. Semple went to American Lace Paper Company as New England sales manager, and thence to Sutherland Paper Company in charge of New England sales.

John L. Perkins III Takes Over As B. F. Perkins Sales Manager

HOLYOKE—John Lewis Perkins, III, has been appointed vice-president and general sales manager of B. F. Perkins & Son, Inc., manufacturers of paper and textile finishing machinery. This business was founded by his great grandfather in 1873 and is celebrating its Diamond Jubilee year.

Mr. Perkins was born in New York City, February 8, 1920. Following his graduation from Taft School, Watertown, Conn., he matriculated at Worcester Polytechnic Institute and withdrew two years later to join the United States Army Air Forces where he was commissioned a lieutenant. His technical knowledge and flying experience brought him a place of instructor and although many times he requested overseas duty, his work was of such importance to the Air Forces that he was retained in it until the end of the war.

Upon his discharge from the Air Forces, he married Ethel Usher of St. Louis. They have one son, John Lewis Perkins, IV, born September 18, 1947.

N. Myra Glazier Joins Republican Speaker Bureau

WORCESTER, Mass.—Miss N. Myra Glazier, president and treasurer of Sheppard Envelope Company, has accepted an invitation to serve on the speakers' bureau of the Republican National Committee. Miss Glazier, prominent nationally in manufacturing and political circles, was requested by Ben Whitehurst, director of the speakers' bureau, to undertake a speaking trip in behalf of the party. The schedule will be announced later.

Two years ago she was a speaker at the national convention of Women's Republican Clubs.

Kupfer Bros. Elect Clark To Vice-Presidency

NEW YORK—Joseph C. Clark, director of sales, Kupfer Brothers Company, paper manufacturers, has been elected to a vice-presidency of the corporation. Dr. Werner Kaufmann continues as president; Fred Stanton, vice-president and Abr. Halpern, treasurer. Kupfer Brothers, founded over 100 years ago, operate a paper factory in Northbridge, Mass., and mills abroad in England, Germany and France. The company has sales offices in Boston, Philadelphia, Richmond, Dallas, Chicago, San Francisco and Los Angeles.

Monsanto Shifts Wilson

EVERETT, Mass.—James A. Wilson has been named production manager of the Merrimac Division of Monsanto Chemical Company, it is made known here. Mr. Wilson will be succeeded as plant manager of the Everett station by Russell L. Miller, former plant superintendent.

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Du Pont Metanil Yellow Conc.
Du Pont Paper Yellow L Conc.
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Lithosol* Fast Yellow HV Paste
Pontamine* Fast Yellow BBL Conc. 125%
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Everest Welcomes 24 To Oldtimer Ranks

WAUSAU, Wis. — The Quarter Century Club of Marathon Corporation inducted 24 new members from its Rothschild division and 11 from its Wausau division on Sunday evening, April 4. Each was presented with a gold watch by D. C. Everest, president and general manager, who has managed the corporation from its beginning 39 years ago. About 400 persons attended.

A. M. Van Douser, Manathon secretary-treasurer, was toastmaster, and Msgr. H. P. Toeller, pastor of St. Mary's Catholic church, gave the invocation and benediction. The speaker of the evening was Fred L. Cobb, Green Bay, who stressed the need for cooperation between employer and employe.

Mr. Everest recalled that when he first assembled a crew for the Rothschild mill, the applicants for jobs frequently were a roving lot and that many of them had worked in a dozen paper mills. He told how the company began to build up a town and to provide things which would attract employes on a permanent basis.

Reporting that the Quarter Century club members includes those who have been in the employ of the corporation from 25 to 39 years, he added that quite a few of them have never worked for any other concern. "You may have made a mistake, or I may have made a mistake in staying with 'Marathon,' but I don't think so," Everest said, adding that time will tell whether or not their judgment was wrong.

"What disturbs me today is what the new people who are coming into this organization have in mind," Everest asserted. He said that many of the young men and women do not seem to want to accept responsibility and that these individuals are not looking for opportunity, but only for "some sort of security."

Everest extended a hearty welcome to the new initiates in the Quarter Century club stating, "You are among your friends and I sincerely hope you may fully enjoy your association with them in these meetings of the Quarter Century club." He also said that this was one of the happiest occasions in his own life, particularly after an enforced absence due to his recent illness which had prevented him from being present at the 1947 annual banquet.

N. Y. C. Tries Diesels to Speed Newsprint Shipments

UTICA, N. Y.—A series of tests that may result in faster delivery of newsprint from Canada was started here April 7 by an 83-car New York Central freight train powered by three 1500-horsepower Diesel units.

Railroad executives said the tests will determine the effectiveness of Diesel units pulling a heavy load over mountain grades. The railroad, starting with a load of 2600 tons, plans to add 100 tons each day as the test train makes a daily round-trip run through the Adirondacks between Utica and Malone, about 150 miles to the north.

Railroad executives said that if the tests prove successful, it will mean faster delivery of newsprint from Canada to New York City. Newsprint usually is brought from Malone to Utica via Watertown and Rome, thus avoiding steep mountain grades.

Sapeyes Plan Their Tournament Season

CHICAGO — The western division of the Salesmens Association of the Paper Industry has announced its schedule of golf outings for the 1948 season, the first to be held Tuesday, June 8, at the Rolling Green Country Club. The second, according to O. L. Bilz, chairman, and W. A. Jones, second in command, will be held at the Medinah Country Club on July 16. The final outing is slated for Friday, August 13, at the Elmhurst Country Club.

An attractive wallet size card has been sent out providing a constant reminder of the dates and also listing the conditions covering play for the "George Gibson Trophy." To be eligible for this attractive award provided by the veteran Mosinee executive, one must be a SAPI member in good standing, the competition must run over a three-year period and members having the low gross in any SAPI outing are in the running. The member having the greatest number of wins in each year has possession of the cup for that year and any one winning two out of three years retains the cup permanently.

All members are being urged to contribute a "nest egg" of $3 each as soon as possible to provide the committee with a guarantee against inclement weather, unexpectedly poor attendance and other contingencies. If the reserve is not used up the unused portion will be used to cut the fee for the August outing and to provide for more attractive prizes.

The interesting announcement forwarded by Mr. Bilz and the unusually fine sequence of country clubs selected for the three outings all combine to indicate that the western division expects its biggest golf outing year in 1948.

Parker Talks Before TAPPI

APPLETON, Wis. — Cola G. Parker, president of Kimberly-Clark Corporation and of the American Paper and Pulp Association, spoke on "Economic Trends in the Paper Industry" at a meeting of the Lake States section of the Technical Association of the Pulp and Paper Industry April 13 at the American Legion clubhouse. The talk was preceded by a dinner.

National Container Fetes Florida Mill

JACKSONVILLE, Fla.—The tenth anniversary of the establishment of the pulp and board division plant of the National Container Corporation in Jacksonville was celebrated with a banquet in Hotel George Washington Wednesday night, April 7.

The chief speaker of the evening was Harold Colee, executive vice-president and general manager of the Florida State Chamber of Commerce. Samuel Kipnis, president of the National Container Corporation, served as toastmaster, and guests at the banquet included city officials, officers of the Jacksonville Chamber of Commerce, the State Chamber of Commerce, presidents of the various civic clubs, executives of the paper mill and box factory of the National Container Corporation and labor leaders.

As pointed out by The Florida Times-Union, the National Container Corporation began operation of the paper mill on Talleyrand Avenue on April 7, 1938, after several months work in establishing the plant and the construction of buildings. At that time the plant represented an investment of over $4 million, and began with approximately 500 employes, and a payroll of $1 million a year.

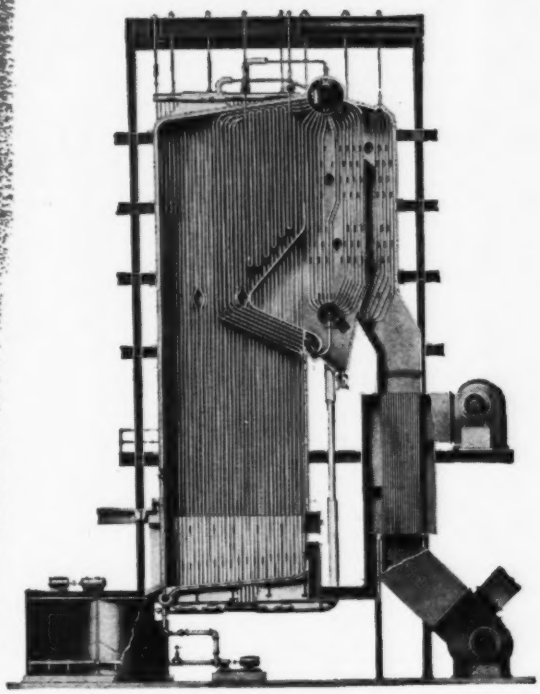
"Today the paper mill and box factory afford employment to more than 1,000 persons, and a payroll of over $2.5 million annually," it was stated. "During the ten years of operations in Jacksonville, the mill has produced more than 750,000 tons of paper, and more than $12 million has been paid out in wages. The National Container Corporation has spent more than $11 million in Jacksonville in that period," Mr. Kipnis said.

Bowes Industries Takes Bondware Business

CHICAGO — The business formerly known as Bondware Products, manufacturer of Bondware paper plates, has been incorporated as Bowes Industries, Inc., with main offices at One North La Salle Street. Arthur S. Bowes, formerly president of Universal Paper Products Company of Chicago, and vice-president of the Lily-Tulip Cup Corporation of New York, is president of the new concern, and R. C. Schenk, also formerly of Universal, is vice-president. Harry Markheim, well known Chicago attorney, is secretary.

Directors in addition to Mr. Bowes are John McKinlay, retired executive; J. Patrick Lannan, Chicago investment banker, director of Standard Gas and Electric, a director of International Telephone and Telegraph, Missouri Pacific Railroad, and other prominent corporations; and C. W. Ooms, prominent Chicago patent attorney, formerly Commissioner of Patents in Washington, D. C.

2 new 350-ton Recovery Units



Typical design of latest B&W-Tomlinson Recovery Unit. Ability to handle wide variation in black liquor concentration, with high chemical and heat recovery, are among its operating features.

largest ever built!

Largest capacity black liquor recovery units so far developed are the two B&W-Tomlinson units recently ordered for use on southern kraft. These units each have a capacity of 350 tons per day and will each produce approximately 154,000 lb. of steam per hour. Selection of these B&W-Tomlinson units was heavily influenced by the satisfactory performance of units recently placed in service at other plants. Results there have thoroughly demonstrated their high degree of reliability, continuity of service and maintenance economy resulting from progressive improvements, including elimination of routine hand lancing.

P-25

FOR PAPER MILLS — B&W-Tomlinson Recovery Units . . . B&W, Integral-Furnace, Stirling, Type H Stirling and Cross-Drum Boilers . . . Boiler Components . . . Pulverizers . . . Fuel Burning Equipment . . . Seamless & Welded Tubes for All Pressure and Mechanical Applications . . . Refractories . . . Process Equipment . . . Alloy Castings.

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Mateer Cites Scott's Production Progress

PHILADELPHIA—At the 1948 meeting of Scott Paper Company, held in the Chester plant, Thursday, March 25th, the principal business was the election of the company's 12 directors. The directors who served during the past year were reelected by unanimous vote of approximately 65 percent of the common shares outstanding, represented at the meeting by proxies and personal attendance.

While judges of election were tallying the vote, Executive Vice-president R. C. Mateer briefly reviewed the accomplishments of the past year. He said that it was gratifying to be able to report earnings of $3.02 a share for the year as against $2.07 a share in 1946 on a slightly smaller number of shares.

Mr. Mateer said that he fact in which the management takes most pride is that it was possible to accomplish this financial result with only modest increases in the selling prices of the company's products, and at the same time maintain the high quality of its products.

"Perhaps the greatest single accomplishment, measured in production increase over the previous year, has been at Fort Edward," said Mr. Mateer. "The mill was purchased in 1944. Although the purchase price was most favorable from our standpoint, I can tell you that at the same time the mill and equipment were in no condition to produce anything. In the two and a half years that have elapsed since, a miracle has been accomplished there. It is now a going plant in every sense of the word, and although further efficiencies must be attained, Ford Edward has become a very substantial contributor to our over-all volume."

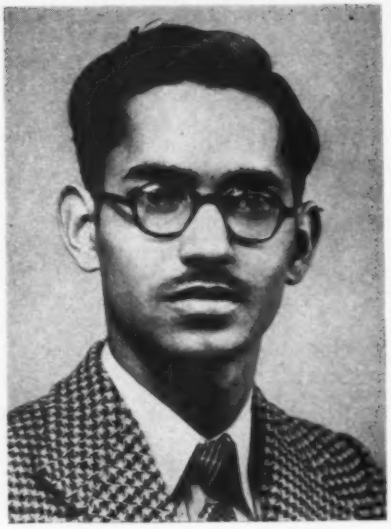
Mr. Mateer said further: "Right now our sales are running at the rate of about 70 million dollars for the year. Our pulp requirements are well covered although the price situation with respect to the pulp we purchase, which is about 50 percent of our requirements has not greatly improved. We will continue every effort to avoid any additional price increase, no matter how small, but of course that must depend to a considerable extent on the degree of further inflation that may develop."

Mateer concluded with the statement that the success of the company's operations reflects what they feel are sound policies, carried out by a very capable and efficient group of people.

Pulp Warehouse Planned At Niagara Falls

NIAGARA FALLS, N. Y.—Application for a building permit covering construction of a pulp warehouse, to cost an estimated $100,000 has been filed in the office of Building Commissioner Norman G. Ray by the International Paper Company.

Construction of the pulp warehouse, which will be located in Buffalo avenue between the extensions of Twelfth and Thirteenth streets, is understood to be a part of the International Paper Company's system-wide expansion program. Pulp for the making of paper has formerly been stored in the open by the company here.



BISWANATH SEN
of Calcutta, India, winner of the 1948 student award of the Paper and Twine Association at the Institute of Paper Chemistry.

Names Committee for Soda Ash Industry

WASHINGTON — The Secretary of Commerce late last week appointed a soda ash and caustic soda industry advisory group, in line with the previously-announced action of these producers in approving plans for such a committee which will consider a voluntary industry agreement covering these commodities under the voluntary control program authorized by Congress.

Members of the committee are: W. J. Murphy, American Potash & Chemical Corp.; K. B. Stuart, Manager, Colorado Fuel & Iron Corporation; Fred W. Fraley, Diamond Alkali Company; L. I. Doan, Dow Chemical Company; Daniel Townend, President, Fields Point Manufacturing Co.; R. W. Hooker, Hooker Electrochemical Co.; E. E. Routh, Vice President, Mathieson Chemical Corp.; S. W. Jacobs, Vice President, Niagara Alkali Co.; R. S. Roeller, Pennsylvania Salt Manufacturing Co.; Chad F. Calhoun, Vice President, Permanente Products Corporation; W. I. Galliher, Chemical Division, Pittsburgh Plate Glass Co.; A. B. Chadwick, President, Solvay Sales Corp.; T. A. Haschke, Sales Manager, Stauffer Chemical Company; Louis Neuberg, Westvaco Chlorine Products Corp.; Bert Cremers, Vice President, Wyandotte Chemicals Corp.

Ambridge Points to Abitibi Improvement

TORONTO, Ont. — Abitibi Power & Paper Company directors are doing their best to get the company into a position which will safely permit payment of dividends on the common stock, President D. W. Ambridge told shareholders at the annual meeting last week.

"We don't think it is in the interests of shareholders," declared Mr. Ambridge, "in our judgment, the time has not come, if we are to retain a liquid position. It is not two years since the company came out of receivership, and the board is not ashamed of what it has accomplished."

J. Ernest Guite of Perce, Que., a common shareholder, asked that the utmost be done to pay common stock dividends, stating that many had held Abitibi common for ten or twenty years without dividends.

Operating profits for the first quarter have been maintained due to increases in the prices of products and to continued increased production, the president told the shareholders. He emphasized, however, that production costs continue to increase, and pointed to a recent award of a 21 percent increase in freight rates.

"Directors are especially concerned with the need for adequate working capital in an operation such as ours, in which very large sums are unavoidably tied up in inventories, particularly pulpwood inventories," he said.

The rehabilitation program is proceeding on schedule, with most of the work expected to be finished by mid-1949.

Kimberly-Clark Editors Meet at Dinner

NEENAH, Wis.—Seventy-seven members of the staff of *Cooperation*, Kimberly-Clark Corporation house organ, were guests at a dinner meeting April 8 at the Valley Inn. Staff members from the local mills and offices, Appleton Atlas, Kimberly mill and office and Niagara mill attended.

Fred S. Seaborne, chief mill manager, discussed importance of the magazine to employes and its interest to the community, pointing out its role in furthering the welfare of the corporation and the people who make it up.

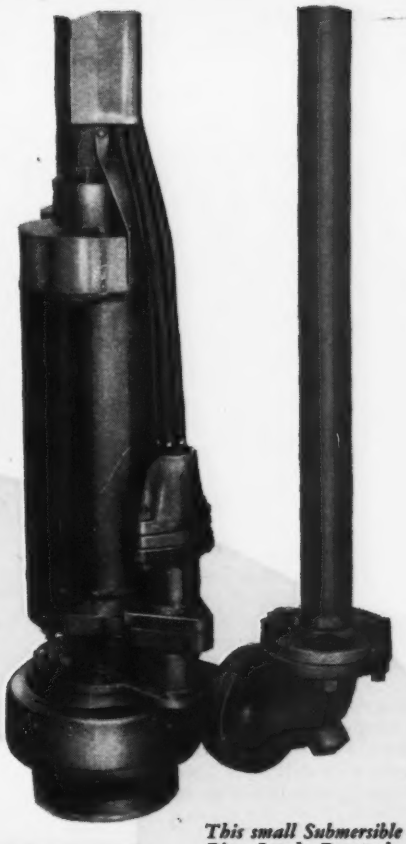
Jack Jansen, recently retired from Kimberly mill, recalled experiences in the early days of editing and publishing the magazine which has a continuous publication record since 1917. Jansen was the first staff member and continued in that capacity until his retirement.

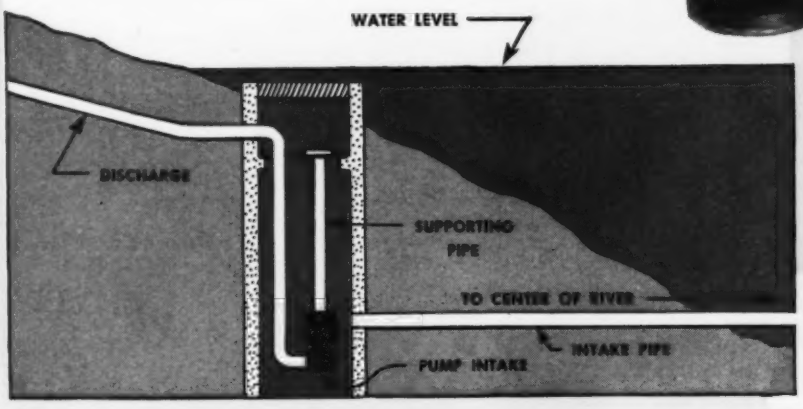
James Shattuck, editor in chief of the magazine, presided during the discussion period following the talks. M. J. Schulenberg, assistant to Cola G. Parker, corporation president, and Robert Mott also spoke during the meeting.

Pumping from lake or river?
...with icing in winter?
and high water in the spring?

get *Under* the trouble with a **BJ**

SUBMERSIBLE RIVER INTAKE PUMP





This small Submersible River Intake Pump delivers river water at 100 gpm against a 55 ft. head. Consistent water delivery in spite of 40° below zero North Dakota Winter temperatures and Spring high water 45 feet above the pump intake.

CAPACITIES: to 5000 gpm
MOTOR SIZES: 7½ to 350 hp
INSTALLATION: Vertical, Horizontal, or on an incline

Down at the bottom of the river or lake it doesn't matter about ice or high water. That's why the Submersible is the logical solution to this kind of pumping problem. It operates regardless of surface conditions.

Sealed oil-filled submerged motor is close-coupled direct to pump (pump can be any one of several different types).

Starting panel (equipped for manual or automatic starting) can be located at any convenient point above flood stage. Discharge pipe should be buried enough to eliminate freezing.

Many other advantages. Easy to install. Simplified intake structure. No adjustments. No pump house. Operates for months without attention. Safe against vandalism.

Byron Jackson Co.
Established 1872
LOS ANGELES 54, CALIFORNIA
Offices in Principal Cities

FINANCE

B. C. Pulp & Paper Earns $2.5 Million

VANCOUVER, B. C.—Net profits of $2,555,932 earned by the British Columbia Pulp & Paper Company Limited during 1947 were plowed back into the business according ot the annual report of the company released to shareholders. The net income was two and one-half times the 1946 figures of $991,230. Income tax provisions totaled $2,600,000.

"Earnings of the past year have gone chiefly to plant improvements," the report emphasized. "It is the desire of the company to meet requirements of cumulative arrears on preferred stock and to develop regular payments of dividends on all classes of stock. . . . It is considered that the present program of mill improvements for the purpose of reducing operating costs is the best method of attaining these ends."

Improvements include a new dam and penstock, new high-pressure steam generators and a hydraulic barking plant at Woodfibre. These units, it is expected, will begin operating in May.

Plans are in the making for similar improvements at the Port Alice plant.

The company has applied to the provincial government for forest management licenses to ensure sufficient lands to obtain timber growth equal to cut.

Production of pulp during the year was 128,734 tons, 16,670 tons above 1946 output.

Accumulated net income, from a gross of $6,425,995, re-invested or retained in the business at December 31, 1947, was $1,954,787.

Another $440,000 went to the company's newly-introduced pension plan, in respect of employes' past services.

During the year, the company issued $6 million in three and one-half percent first mortgage bonds. This was used in part to redeem all outstanding six and seven percent sinking fund gold bonds and to provide $1,789,813 of increased working capital amounting to $2,455,197 demanded by the year's higher level of business.

Dividends were paid quarterly on preferred shares and interest payments on first mortgage bonds paid in full, but no dividends were paid on common stock.

Stone Container Reports Record Earnings

Stone Container Corporation, has reported record sales and earnings in 1947, the first full year of operations in which the company ran its own paper mills. These plants, at Franklin and Coshocton, Ohio, operated at full capacity, producing about 55 percent of the firm's paper-board requirements. A 50,000 square-foot addition to the Chicago plant is planned for construction this year.

Sales totaled $13.6 million last year, an increase of 38.5 percent over 1946 volume of $9.8 million. Net income of $2,040,126, equal to $2.91 a share on 700,000 capital shares outstanding in 1947, compared with $1,321,282 or $2.20 a share on 100,000 less shares the preceding year.

River Raisin Profit Doubled in 1947

MONROE, Mich.—Net profits of the River Raisin Paper Company for 1947 were slightly more than double those of the previous year, according to the annual report and president's letter submitted to stockholders at the annual meeting.

Net profit for the year, after provision of $845,000 for federal and state taxes on income, amounted to $1,313,809.59. This is equivalent to $2.85 per share on the 461,365 shares of capital stock outstanding. It compares with a profit for the year 1946, after provision for $420,000 federal and state income tax, of $647,698.03, which was equivalent to $1.40 per share. Cash dividends paid during 1947 aggregated 70 cents per share of a total of $322,955.50.

Despite the satisfactory profit for the year, President C. L. Wood states in his letter to stockholders that the company's net working capital "has increased only $248,417.22 to an aggregate of $1,801,067.64." By far the greatest part of the company's profits, the report says, have been reinvested in the company's three-year program of general plant improvement. Expenditures in connection with the program during 1947 aggregated $928,079.53 with committments, running into 1948 and 1949, of approximately $1,200,000.

Net sales increased from $10,886,805.41 in 1946 to $15,320,226.73 in 1947, an increase of $4,433,421.32. This expanded sales volume, President Wood points out, necessitated the maintenance of a substantially larger supply of raw materials. The result in inventories, on Dec. 31, 1947, amounted to $1,593,435.02 against $1,-

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending April 10, 1948

STOCKS

	High	Low	Last
A. P. W.	5½	5⅜	5⅜
Armstrong Cork Co.	49⅜	49¼	49½
Armstrong Cork Co., 4 pf. 4	110½	109½	109¾
Armstrong Cork Co., pf., 3¾	94½	94	94½
Celotex Corp.	26½	25⅝	25⅞
Celotex Corp., pf.	19½	19	19
Certain-Teed Products Corp.	16⅛	15⅜	15⅞
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	22⅛	20	21¾
Champion Paper & Fibre Co., pf.	96½	95	96
Congoleum Nairn Co.	33½	32⅜	32⅞
Container Corp. of America	40¾	40⅛	40½
Crown Zellerbach Co.	30	29	30
Crown Zellerbach Co., pf. 4.20	98	97	97¾
Crown Zellerbach Co., 4 pf. 4	112	109½	109½
Dixie Cup Co.	36½	35	36
Dixie Cup Co., A	52	52	52
Flintkote Co.	36¾	36⅛	36¼
Flintkote Co., pf.	100	99¼	100
Robert Gair	8⅜	8⅛	8⅜
Robert Gair, pf.	18½	18½	18½
International Paper Co.	54⅞	49⅜	54¼
International Paper Co., pf.	97	95½	97
Johns-Manville Corp.	....	....	....
Johns-Manville Corp., pf.	39	37⅞	38
Kimberly-Clark Corp.	22¾	21½	22
Kimberly-Clark Corp., pf.	101¾	98½	101¾
Mac Andrews & Forbes	....	....	....
Mac Andrews & Forbes, pf.	....	....	....
Marathon Corp.	22½	21¼	22½
Mead Corp.	20⅜	20	20⅛
Mead Corp., pf. 4¼	86½	85	86½
Mead Corp., pf. 2	42	42	42
National Container Corp.	13⅛	12¾	12¾
Paraffine Companies, Inc.	25¾	25½	25¾
Paraffine Companies, Inc., pf.	102¾	102¾	102¾
Rayonier, Inc.	29⅜	27⅞	29
Rayonier, Inc., pf.	34½	34⅛	34½
Ruberoid Co.	64½	61½	62
St. Regis Paper Co.	10⅜	9⅞	10⅜
St. Regis Paper Co., pf.	85	85	85
Scott Paper Co.	45	43¾	45
Scott Paper Co., pf.	91	91	91
Sutherland Paper Co.	39½	38½	38½
Union Bag & Paper Corp.	33	31½	32⅛
United Board & Carton	14	13	13⅞
U. S. Gypsum Co.	98⅞	95	97
U. S. Gypsum Co., pf.	174½	174½	174½
United Wallpaper	4⅜	4¼	4⅜
United Wallpaper, pf.	....	....	....
West Virginia Pulp & Paper Co.	43	40⅛	42½
West Virginia Pulp & Paper Co., pf.	103	102¾	103

BONDS

Celotex Corp., 3½s '60	99¼	99¼	99¼
Certain-Teed Products Corp., 5½s '53	....	....	....
Champion Paper & Fibre Co., 3s '65	96½	96	96½
Mead Corp., 3s '68	....	....	....

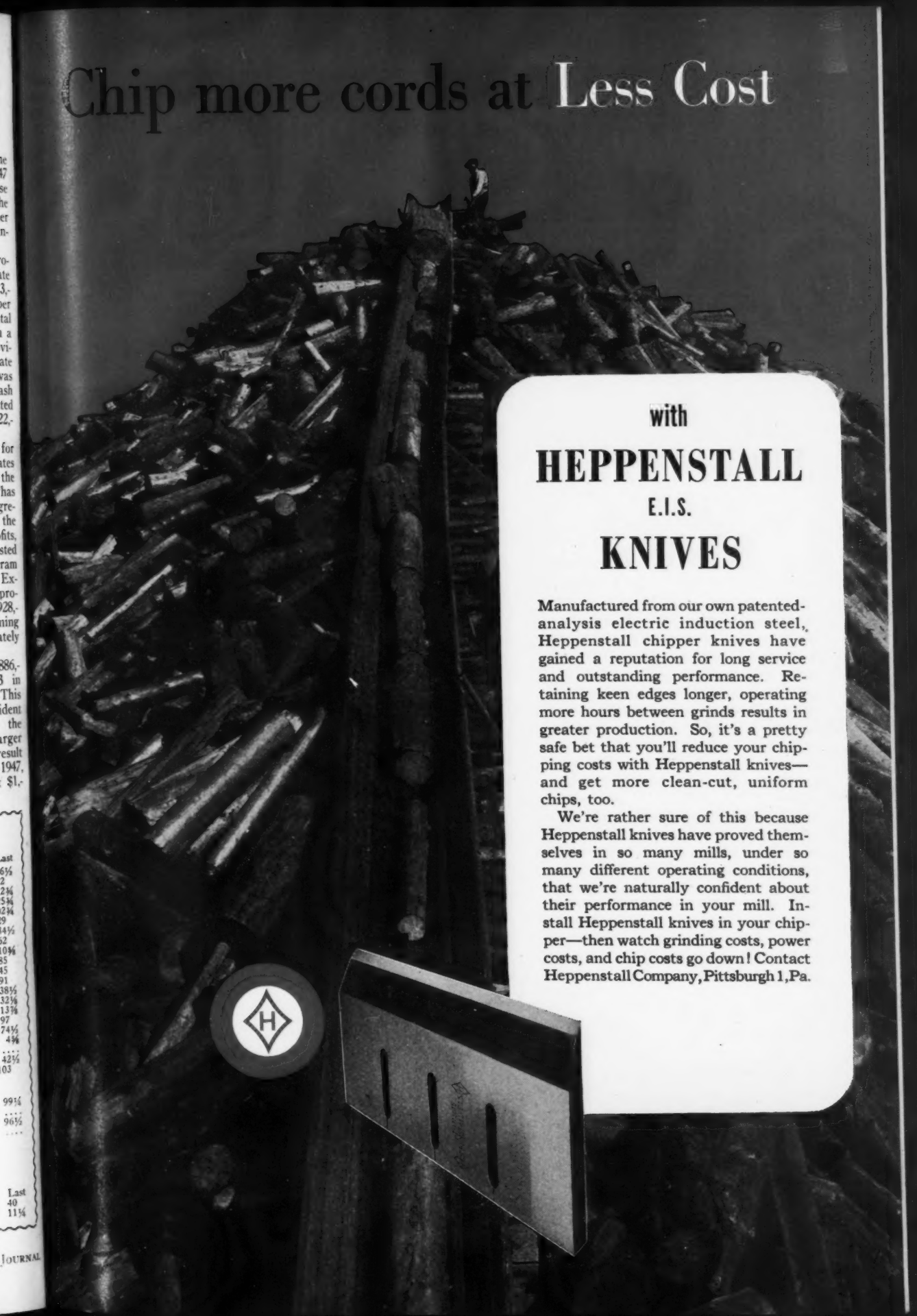
New York Curb Exchange

High, Low and Last for Week Ending April 10, 1948

STOCKS

	High	Low	Last
Great Northern Paper Co.	40½	40	40
Taggart Corp.	11¾	11	11⅛

Chip more cords at Less Cost



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Manufactured from our own patented-analysis electric induction steel, Heppenstall chipper knives have gained a reputation for long service and outstanding performance. Retaining keen edges longer, operating more hours between grinds results in greater production. So, it's a pretty safe bet that you'll reduce your chipping costs with Heppenstall knives—and get more clean-cut, uniform chips, too.

We're rather sure of this because Heppenstall knives have proved themselves in so many mills, under so many different operating conditions, that we're naturally confident about their performance in your mill. Install Heppenstall knives in your chipper—then watch grinding costs, power costs, and chip costs go down! Contact Heppenstall Company, Pittsburgh 1, Pa.

043,631.28 at the end of 1946. The company, realizing the dangers of a relatively large inventory, has set up a reserve of $250,000 for possible future decline in inventory prices.

Commenting on the company's capital improvement program during current high building costs, President Wood states the management's belief the program is necessary at this time to successfully meet the challenge of competition.

"The reduction per ton cost of output which these improvements are expected to produce," the report reads, "will afford greater long-term security to the business protecting the jobs of employes and the investment of stockholders. The completion of the program without special financing will require the continuation of satisfactory profits and reinvestment of a substantial portion of such profits."

The company's balance sheet shows total assets of $6,376,372.73 including $3,495,414.17 of current assets. The current assets are $434,219.07 in cash, $781,566.83 in U. S. securities, $68[illegible]-193.25 in trade accounts receivable after reserve of $25,000 and inventories of $1,593,435.02. Other assets include miscellaneous advances and accounts receivable of $10,167.66, deferred charges of $27,340.88 in unexpired insurance premiums and property, plant and equipment valued at $2,843,450.02 after reserve for depreciation of $3,356,193.26.

Current liabilities are $1,694,346.53 including trade accounts payable of $441,356; pay rolls and commissions, $257,220.11; local and pay roll taxes including income tax withheld, $138,-872.38; employe deposits for purchase of savings bonds, $7,698.24 and estimated federal tax on income of $849,-199.80.

The capital stock, at a par value of $5, is listed at $2,306,825 for the 461,-365 shares outstanding of the authorized 500,000 shares. Surplus is carried at $4,432,026.20 of which $392,-265.01 is capital surplus and $1,732,-936.19 is earned surplus.

The profit and loss statement shows $12,186,464.80 as the cost of products sold and $1,019,043.30 as selling, administrative and general expense for a balance from sales of $2,114,718.63. Other income amounted to $44,090.96 for total income of $2,158,809.59.

Champion Arranges for $5.5 Million Financing

NEW YORK—Champion Paper & Fibre Company has borrowed $5,500,-000 in transactions arranged in conjunction with Goldman, Sachs & Company. The company sold privately $4,-180,000 of 3¼ percent sinking fund debentures due in 1965 to an insurance company and borrowed $1,320,000 from banks on 2½ percent notes maturing from 1950 to 1953. A sinking fund is to retire $335,000 of the debentures annually beginning in 1954.

St. Regis Sales Rise For First Quarter

NEW YORK—St. Regis Paper Company net sales in the first quarter of 1948 mounted to a new peak of $40,-397,564, stockholders were told at the annual meeting April 9 in New York by Roy K. Ferguson, president. This compared with $32,938,299 for the like period of 1947.

Net profit for the quarter amounted to $4,494,193, equal, after preferred dividend requirements, to 83 cents per share on the common stock, against $3,698,826, or 67 cents per share in the corresponding quarter of last year.

Represented at the meeting in person or by proxy were 4,612,680 shares or 89.2 per cent of a total of 5,170,714 shares of common stock outstanding.

In reviewing the past year and the prospect ahead for the company, Mr. Ferguson pointed out that the results attained in the first quarter were without benefit of the company's new kraft paper mill at Pensacola, Florida, which came into production several weeks ago, or the converting capacity of the new multiwall bag plant.

He suggested that in the light of the benefit which will accrue for the remainder of the year from the additional Florida capacity, it appeared reasonable to expect that an increase in sales of 15 per cent this year over 1947, as estimated earlier by him, would be attained or even surpassed, barring unforeseen developments.

Commenting on dividends, Mr. Ferguson said that while the board of directors had been following a "conservative dividend policy," it would, "with a continuation of favorable earnings look at the question of extra dividends" during the third and fourth quarters. The company resumed payments on the common stock on December 1, 1947 with a regular quarterly of 15 cents and an extra of 10 cents a share, after which it paid a quarterly of 15 cents a share for the first quarter of this year.

Stockholders were told by Mr. Ferguson of the strong position which the company enjoys in the matter of timber resources. He explained that the company now holds or has cutting rights on 1,800,000 acres of timberland and that such holdings are the greatest insurance the company has for future operations.

Mr. Ferguson said that prices are leveling off and the company is meeting resistance to further price increases for its products. This, he stressed, is typical of industry in general. "We are on a price plateau now, so that our earnings should be increased by reason of lower costs and savings that can be effected," he stated.

"We are continuing to operate our research development department at top speed," he added. "We believe that by so doing we can increase our share of the available business and we can create such additional business in the bag, and Panelyte fields, and in the development of specialty paper."

Stockholders approved an amendment providing for classification of directors. The change provides for classification of the eighteen directors into three classes, each composed of six board members. As a result of the amendment the term of office of one class of directors will expire in each year hereafter.

Also approved by stockholders was a retirement pension plan for employees and officers of the corporation and certain of its subsidiaries. The plan will become effective on July 1, 1948.

Rayonier Sales Up For First Quarter

NEW YORK—Rayonier Incorporated, producer of purified wood cellulose, showed first quarter sales of approximately $15,400,000, compared to $11,-821,000, for the first quarter of 1947, according to preliminary figures announced by President Edward Bartsch at the annual meeting of stockholders yesterday. These preliminary results indicate quarterly earnings of $2.16 per share of Common Stock after providing for Preferred Dividends, compared with $1.49 per share for the first quarter of last year.

Mr. Bartsch emphasized the need to pursue a conservative dividend policy in order to provide funds for substantial capital expenditures required to keep pace with customers' demands, and to meet payments on the Company's long-term debt. He added that if profits continue at the same rate as in recent months, it is probable that increased dividend declarations may be expected late this year.

The regular quarterly dividend of 25 cents per share was declared on the Common Stock, payable May 14 to stockholders of record April 30. The regular Preferred Dividend of 50 cents per share also was declared, payable July 1, to stockholders of record June 11.

Present officers and directors were reelected.

Sidney Roofing Sales Establish New High

VANCOUVER, B. C.—Sales during the year 1947 reached an all-time peak with the Sidney Roofing and Paper Co. Ltd., of Victoria and Vancouver, B. C., according to the annual report of the company just released.

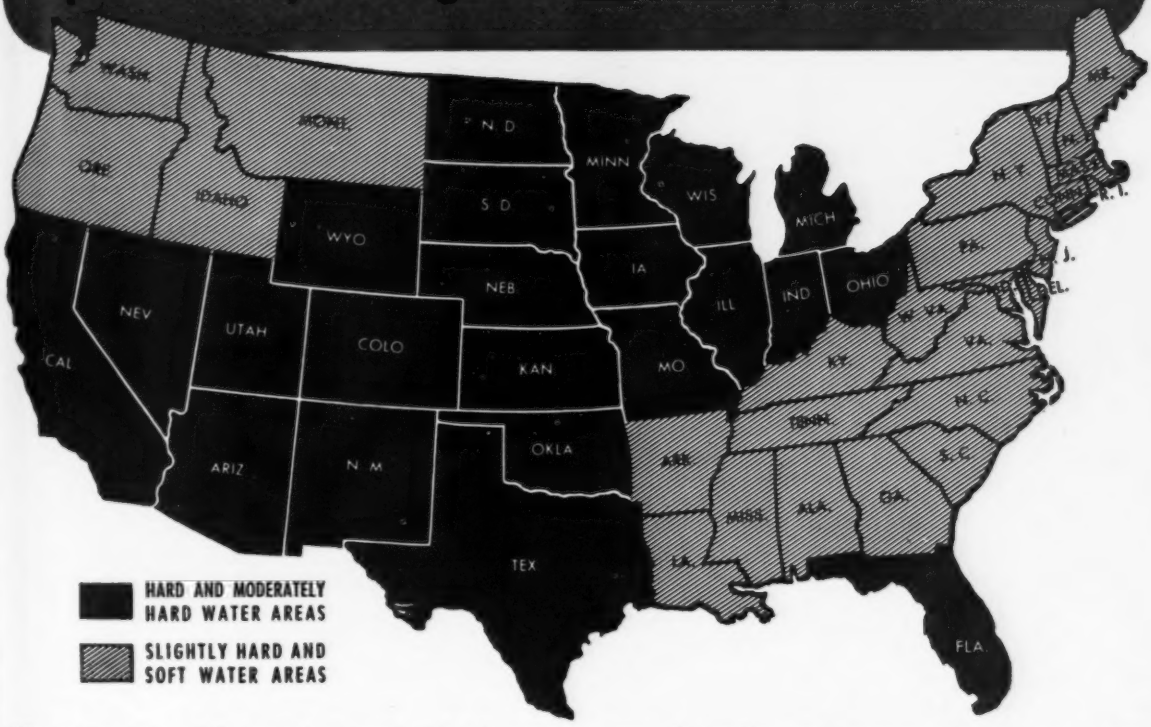
Net profits after taxes and payment of dividends to Class "A" shareholders were $184,750, equal to $1.85 per share on outstanding Class "B" shares. This balance was retained for expansion and increased working capital requirements. Earnings in 1946 totaled $174,-631.

During the year medical insurance and employee contributory, pension plans were inaugurated by the company, which also brought into production its new roofing division.

Announcing NOPCO KFH

A NEW VERSION OF NOPCO KF*

specifically designed for Hardwater Areas



Where does your mill fit into this picture? If it is located in any of the hard or moderately hard water areas shown on this map, then NOPCO KFH — new *hard-water* version of NOPCO KF — can definitely help you to solve some of the tougher problems of paper production. From Nopco KFH you'll get the same unsurpassed foam-killing effectiveness that has long distinguished Nopco KF in paper mills throughout the world. As an *important plus,* you'll also find Nopco KFH *more readily dispersible,* resulting in easier, speedier preparation of stock emulsions.

The same quick action, dependability and economy. Like NOPCO KF, NOPCO KFH needs but minutes to drive foam from the head-box, clear bubbles from the wire. Like KF, KFH improves sheet formation even at increased machine speeds, with better than 75% elimination of thin spots. What's more, Nopco KFH is proving as effective as Nopco KF in providing these advantages to mills in *soft-water* areas. For this reason—and because of its *greater ease of handling*—mill operators in soft-water regions will find Nopco KFH well worth investigating.

NOPCO KFH, in short, is another outstanding product added to an already versatile and successful line of NOPCO products — all acknowledged leaders in their field. NOPCO KFH is a further example of Nopco's continuing program of research, whose aim is to provide the Paper Industry with the most advanced developments in processing chemicals.

See what this *new chemical substance* — expressly formulated to aid sheet formation and eliminate foam in hard-water areas — can do in *your* mill. Why not include a barrel or two of NOPCO KFH in your next order for regular NOPCO KF?

NOPCO CHEMICAL COMPANY, Harrison, N. J.
formerly National Oil Products Company
Branches: Boston • Chicago • Cedartown, Ga. • Richmond, Calif.

FOR KF PERFORMANCE IN HARD WATER

*REG. U.S. PAT. OFF.

NOPCO KFH

NOPCO TRADEMARK EVOLVED THRU RESEARCH

An Affiliate of the American Pulp and Paper Mill Superintendents Association

Third Session Ends For Forestry School

VANCOUVER, B. C.—Under the auspices of the British Columbia Forestry Service a unique school recently concluded its third successful year of operations at the Green Timbers Forestry Station of the B. C. government on the Trans-Canada highway near New Westminster. Forestry rangers and their assistants attended this school annually to learn new techniques in conserving and replenishing the forest resources of British Columbia.

This venture of the B. C. Forest Service embarked upon on January 7, 1946, has proved an unqualified success, and tenders are now being called for permanent classrooms and offices to replace present temporary accommodation. It is hoped in the future to build permanent living quarters for the students.

The course is operated in two three-month terms, with the first starting in January and ended April 8. The rangers then go to B.C.'s timberlands for the summer season and reconvene for the fall session of the school September 15.

Forester Douglas Greggor and Assistant Forester James Pedley instruct the class of 20, assisted by special lecturers from the Provincial Police, Department of Foret Pathology and others. Students are graded on the course and the marks count towards future promotion.

Some of the many subjects taught during the spring course are fire law, the Forest Act and enabling legislation, meteorology, fire behavior and protection planning, how fires occur and behave, public relations, radio communication, telephone line construction and maintenance, trail and forest road construction, care and operation of mechanical equipment, map reading, practical surveying, tree diseases, insects, botany, wood technology and public speaking.

The fall term deals with forest management and field trips are made in the 640 acres of timber plantation surrounding the station. Cruising, stumpage appraisals, silviculture and log healing are taught. All students take the government's seedling examination on conclusion of the course. Instructor Greggor states only one of last year's class of 20 failed the exam.

The school's instructors are both veterans of the forest department. Chief Instructor Doug Greggor was formerly district forester at Prince George and has been a member of the forest service since 1923. Assistant Instructor James Pedley was formerly fire inspector of the Vancouver district.

Cady Firm Moves Offices

CHICAGO — E. J. Cady & Company, manufacturer of paper testing instruments has moved to new offices at 134 N. La Salle Street. This 59-year-old firm continues to manufacture the Cady bursting strength tester for boards and papers, Cady micrometers for measuring thicknesses, paper and tissue scales. William Y. Chatterton, grandson of the original founder, is president of this firm, and in charge of all operations.

Tree Camp to Open At Eagle River

MERRILL, Wis.—The Trees for Tomorrow Conservation Camp at Eagle River will open on May 7, according to *Tree Tips,* publication of Trees for Tomorrow, Inc. The camp is operated in cooperation with the United States Forest Service. Forty boys from high schools at Stevens Point and Wisconsin Rapids will return from their second annual in-the-field conservation workshop and will go to the camp. In charge will be Alfred Hornigold, Wisconsin Rapids, and Ray Gilbertson, Stevens Point.

Before the first group arrives the camp will be opened for repairs and improvements. A second annex building will be converted into a study hall, offering the facilities of three buildings in which lectures or classes may be held.

There will be an accredited summer school session of the Central State Teachers College at Stevens Point from June 21 to July 24. Most reservations for this have already been completed. Other groups having scheduled periods during May include:

American Pulpwood Association training school; conservation class, Central State Teachers College; U. S. Forest Service supervisors of Region 9; U. S. Forest Service fire training session; and a tour group of 60 sponsored by the Milwaukee Public Museum. The camp will operate from May 1st until November 1st with the following organizations scheduled throughout the remaining five months' period:

North Central Wisconsin Educators School Forest Workshop; Vilas, Oneida, and Forest County 4-H Club boys and girls; Trees for Tomorrow forestry scholarship winners of present and past years; Wisconsin State Teachers College five week summer school session; Research Staff, Institute of Paper Chemistry; Milwaukee County Conservation Alliance; Wisconsin Roadside Development Association; Wisconsin Recreation Laboratory Association; Staff of Forest Products Laboratory; Milwaukee Federation of Womens Clubs; first year classmen of the Institute of Paper Chemistry; Trees for Tomorrow 4-H Club Forestry Award Group; Conference of northern Wisconsin county agents; Forest Industries Information Committee (tentative); University of Wisconsin Conservation Class; and U. S. Forest Service Orientation School.

Vancouver Island To Get Seedlings

VANCOUVER, B. C.—Six-inch, two-year-old fir seedlings from the Green Timbers nursery of the provincial government in Surrey, B. C., will be planted in over 10,000 acres of logged-off and burned-off lands in Vancouver Island in the immediate future. The work will be carried out by over 400 persons who will plant over 13,000,000 trees. During the Easter holidays school children at Youbou and a number of other points on Vancouver Island were called on to assist in this work.

Output of the two Island nurseries at Duncan and Campbell River will soon equal that of the first nursery established by the department at Green Timbers, Surrey. This will give a total of more than 20,000,000 seedlings a year and will allow present restocking operations to be almost doubled in a short time.

Only 1,117 acres were restocked in 1939.

Dr. B. M. Barr, formerly head of the department's research division and now executive assistant to the president of Berkeley University, pioneered in 1927, the idea of growing young trees for replacement of B. C.'s diminishing forests.

The first nursery was established on a city lot on Shellburn Street in Victoria and was moved to the Green Timbers area when it was still being logged off in March, 1930. Yearly production was 300,000 trees in 1932 at the Green Timbers nursery, as compared to the 7,000,000 trees grown on the 22 acres of land used for the nursery this year.

Balance of the 665-acre tract is planted in experimental plantations and the possibility of the Green Timbers becoming a reality very soon instead of just a name is seen in the statement of Superintendent Tom Wells that the first trees planted by him along the Trans-Canada Highway in 1932 have already reached a height of 30 feet.

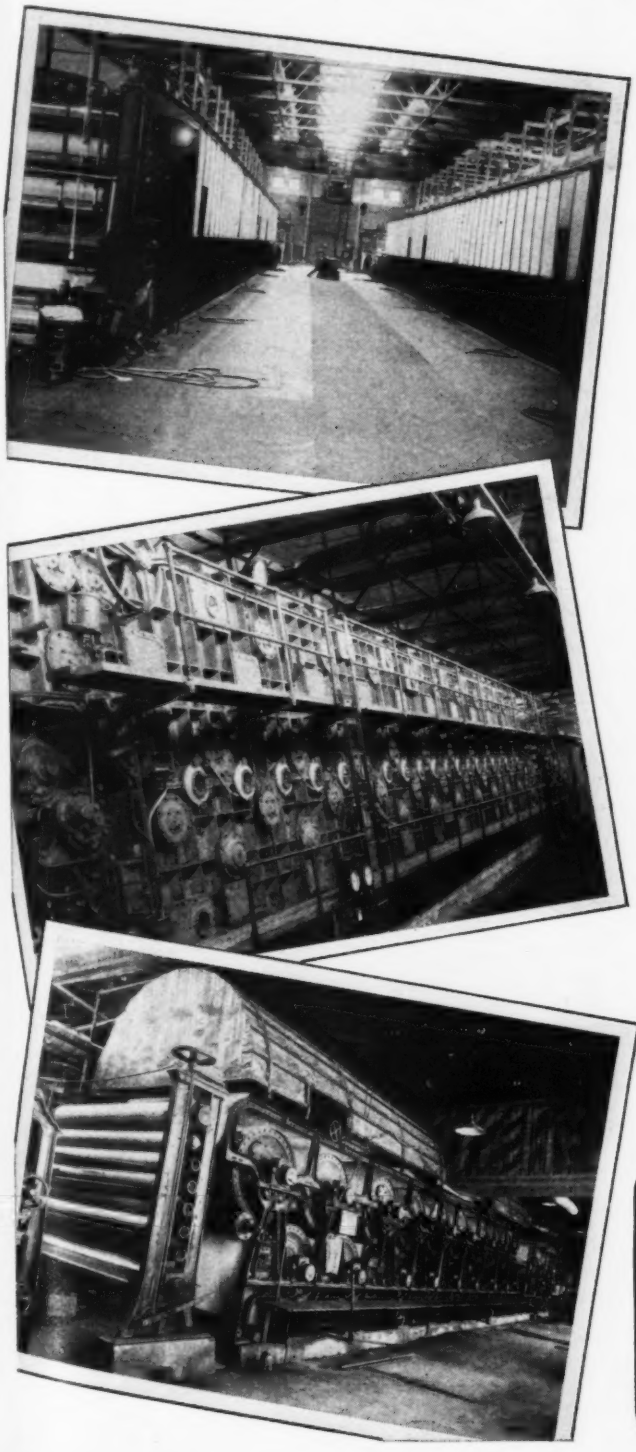
Some cedar and hemlock are produced but 95 percent of the season's production is Douglas Fir.

Permanent staff of Green Timbers nursery is five with 30 part-time workers being employed in the spring. The nursery stock is grown from seed extracted from cones, collected by forest rangers from healthy, vigorous trees and is sown in rectangular beds four feet wide and 50 feet long. The beds are irrigated during the summer months.

The seedlings are root-pruned when they are a year old by a special machine developed by the nursery. This machine is an oscillating underground blade powered by a gas engine and trims the roots at an even depth of four inches. The seedlings then develop rapidly and in another year are ready for the journey to B.C.'s forests.

DON'T SPOIL

good stock by burning it on the driers



YOU know the saying—"a chain's only as strong as its weakest link." It's as true in the paper industry as anywhere else. For instance, if you don't control steam properly on the driers, you'll spoil the finest stock produced in either a ground wood or chemical pulp mill.

It's generally agreed that a wood pulp fibre once over-dried never regains its original tensile strength. Also that too rapid drying under excessively high temperatures gives you a seared, brittle, discolored sheet.

Whether you are drying wood pulp papers, rag papers, or rag content papers, the *quality of each sheet produced* and *the conversion cost per ton* depend directly on accurate control of steam to the drier. That's where Taylor comes in.

Whatever type of paper machine you use, we can supply you with a dependable system for accurately controlling the steam supply. Result—you'll greatly reduce case-hardening of the sheet, cockles, wet streaks, felt seam marks, curling on the edges and dry end snap-off. Every sheet you produce will be more uniform in folding, tearing, tensile strength, finish and opacity.

Ask your Taylor Field Engineer! Or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

Taylor Instruments

MEAN

ACCURACY FIRST

IN HOME AND INDUSTRY

Ruberoid Contract Grants Extra Day

ERIE, Pa.—Recently-concluded contract negotiations between Local 348, International Brotherhood of Papermakers, and Local 249, International Brotherhood of Firemen and Oilers, and the Ruberoid Company's Sixteenth St. plant call for substantial gains for employes, including a 13-cents-an-hour general increase.

Will M. Stewart, Middle Atlantic State regional director, Papermakers Brotherhood, said the contract also calls for one additional paid unworked holiday, making seven such days; time and one-half for the sixth consecutive day of work and double time for the seventh consecutive day; increase in shift differentials to five cents an hour for the second shift and ten cents for the third shift, plus ten percent over regular hourly rates.

Other gains include pay for four hours upon reporting for work on emergency call-in and time and one-half for following hours worked in emergency. Including fringe adjustments, the result is an increase of approximately 15½ cents an hour for employes engaged in general plant work, and 16¾ cents for swing shift operations. Lowest base pay rate is now $1.20 an hour.

"While the contract was not concluded on the specified expiration date," Mr. Stewart pointed out, "the company readily agreed to a retroactive date for all benefits. This attitude, if adopted by other employers, would eliminate the unnecessary strikes throughout the country at present.

"The two Brotherhoods and the Ruberoid Company are definitely opposed to strikes and they view their bargaining as a shining example for others to follow."

Southern Kraft Starts Mill Photo Contest

GEORGETOWN, S. C.—Southern Kraft Mill here has set up an employe's photographic contest to be held in conjunction with the International Paper Company's 50th anniversary celebration. Entries must be postmarked before midnight of May 1, and should be mailed to the exhibit committee, laboratory, International Paper Company, Georgetown. Judges will be announced later.

Classes are oldest plant photographs, showing old views of the local mill, construction scenes, or the mill site before construction; oldest employe photograph, taken at least five years ago at this or other company mills; most unusual employe photograph, showing off-time activities, picnic groups, and most unusual plant photographs, such as views of the mill taken day or night, odd mishaps or difficulties, high water at the mill, or uncommon accidents.

T. W. TOOVEY

who has joined Cheney Bigelow as sales engineer. Most recently, Mr. Toovey has been associated with the Whitemarsh Research Laboratories of Pennsylvania Salt Manufacturing Company, where he was pulp and paper technologist, investigating bleaching processes, and applications of new chemicals in the pulp and paper field.

Previous to his affiliation with Whitemarsh, Mr. Toovey served as research chemist and technical consultant for Hermanetzer Papierfabrick, Harmanee, Czechoslovakia, where he developed a successful high alpha pulp process for nitrating pulp. Previous work also included association with Dr. M. L. Heuser at British Columbia Pulp and Paper Company, Port Alice, B. C., in charge of cooking and bleaching. Mr. Toovey is widely known as an expert on bleaching, and is the author of numerous articles which have appeared in the trade press. He is a member of TAPPI, the Engineering Institute of Canada, and the Association of Professional Engineers of British Columbia.

Continental Takes Title To Watertown Plant

WATERTOWN, N. Y. — The Continental Can Company, which for more than three years operated a branch factory in the former Ontario Specialties, Inc., building at 740 Water Street, has purchased that concrete building from the St. Regis Paper Company, according to a deed recorded in the Jefferson County clerk's office. The purchase price was estimated at $50,000, based on the internal revenue stamps placed on the deed.

The Continental company closed out its branch plant here in February and transferred its equipment to Utica. The Watertown branch had opened in March, 1945, in the Water street structure which was formerly used by the St. Regis as its printing plant.

It is understood that when Continental Can obtained a lease from the St. Regis for the Water street property, the terms carried an option for the purchase of the building with the rental to apply toward the purchase price.

Tinker Tells Trade Of ERP's Effects

NEW YORK — What effect the European relief program and the possibility of a national defense program may have on the future of their business was analyzed for paper dealers last week, when E. W. Tinker, secretary of the American Paper and Pulp Association appeared before the convention of the National Paper Trade Association. Mr. Tinker declared:

The vast European relief program and the sudden outlining of a new national defense program of uncertain scope is of concern to the pulp and paper industry because of its potential impacts. It is difficult to speak of these impacts with certainty because as yet the national defense program is somewhat nebulous and plans for the ERP program are apparently in a formative stage.

It is my understanding that some eleven billion dollars is being appropriated for national defense in the regular budget and press reports indicate that three or four billion additional will be asked for. On top of this, over six billion dollars has been authorized for foreign aid of one sort or another. It would appear that appropriations involving some twenty billion dollars are to be required for the fiscal needs above the customary operating expenditures of the Federal government. Presumably these vast sums will be required not only for the year 1948 but annually for an indeterminate time in the future.

Perhaps it would not be out of order for each one of us to ponder just what this means. First and foremost, it is obviously a drain on our domestic economy. Military and relief expenditures, regardless of their merit, must be recognized for what they are —non-productive expenditures. I assume that governmental economists have calculated how long we can support this drain. Because of my own background of experience I cannot but reflect that the sums required for a couple of years would, if utilized in the development of the natural resources of this land of ours, create a veritable Garden of Eden. Our problems of soil erosion and of reforestation would be behind us. The full utilization of our water resources for irrigation and power would have been achieved and along with these developments we could have underwritten a stable economy with full insurance against periods of unemployment and economic stress. However, if and unless some leadership develops far beyond anything that has as yet been apparent, it appears that the appalling waste involved in the preparation for war and the carrying on of relief is inevitable.

As to the impact of this program of relief and national defense, upon the pulp and paper industry, I am sure

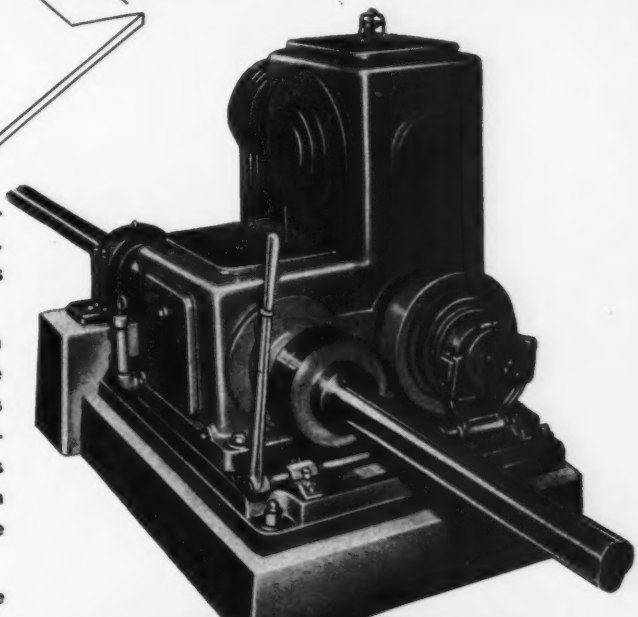
Installation of SYCO Drives has helped to increase paper output on each installation. SYCO contributes to quality control because it is smooth running . . . all the draws stay put.

The precise control mechanism of the modern SYCO Paper Machine Drive facilitates quick, close adjustment of sectional speed . . . then maintains the selected speed without departure. SYCO's interlocking synchronization holds the individual sections in precise speed ratio — preserving uniform tension on the sheet at all times. Breaks are fewer — the machine stays in production with less time out.

SYCO's exact speed control is matched by the ruggedness of its soundly engineered mechanism. SYCO is built for long trouble-free life.

The compact, self-contained modern SYCO drive requires less space, permitting clean, accessible uncluttered space around the machine.

Can the Modern SYCO Paper Machine Drive earn dividends in *your* mill? Write us for full details!



SYCO
MANUFACTURING CORPORATION
Syracuse, N. Y.

some difficulties will be involved. The recollection of our experiences during the last war is too vivid to permit the passing over of what appear to be inevitable circumstances. There is no doubt that the stresses and strains upon industry will not reach the proportions involved in total war. However, from the general public conception of plans that are being developed, I would judge they may approach the situation involved in the national defense program that was carried on prior to the last war. The production of war materiel and stock piling no doubt will have effects all along the line. If labor is diverted from normal production channels, particularly in a full employment period, plus the additional personnel that will be involved in the rehabilitation of the military to a full manned status, it may create man-power shortages that will be acute in some quarters. From past experience I would judge that the pulp industry may have difficulty in maintaining supplies of pulpwood because of shortages of man power. This situation may be alleviated somewhat because of the strides that have been made in mechanizing woods operations.

It seems probable that machinery manfacturers may encounter shortages of critical materials. Transportation difficulties may also ensue.

Press reports indicate that the War Munitions Board is planning to outline a pattern of industrial mobilization which no doubt will reach into the pulp and paper industry because of the requirements that would be put upon the industry in case of a national emergency and the critical necessity of some of the products of the industry under these conditions.

From my contacts with men involved in the initial steps in the development of the Government's program, I feel confident that there is every appreciation of its implications. I know that there is full recognition of the inflationary potential in the situation and every effort will be made to resist it. How far we will be carried into a regimented economy is, of course, uncertain. However, it is to be hoped that everything will be done to stimulate maximum production rather than restrict it with the apparent necessity of reimposition of government controls of one sort or another.

Gentlemen, we are going into a period of stresses and strains, the extent of which we do not know. The pulp and paper industry, through its Council to the Department of Commerce, has a vehicle for bringing the best intelligence in the industry to bear upon problems that may arise affecting the pulp and paper industry and the program of the U. S. Government. I have every assurance that this Council will be used and I believe beyond a doubt if this is the case, many of the mistakes that were made in the last national defense program can be avoided.

N.P.T.A. Elects Luff As President

(Continued from page 7)

coarse papers as those broad terms are ordinarily used. As to fine papers, I have heretofore referred to it as the civilizing influence of the printed word —for the over-all use of printing papers is one measure of literacy and as literacy grows the demand for more of the printed word in turn increases. In the coarse paper field, it is the fact that growth has resulted in part at least through the development of new uses largely as substitutes for other materials. We saw that occur during the late war, and what may be facing us in the near future can give further impetus to that trend. But it is equally true that what may be facing us can well retard that esoteric influence in the fine paper field; and as I do not profess to know where our new course will take us as a nation, I shall at the moment confine myself to the first two groups of forces—supply and demand.

Many analysts deal largely with the second group of forces (those that relate to production and supply of paper) apparently on the assumption that "demand" is a nebulous force from some source outside the industry which exerts either a strong or weak pull upon the production facilities of the industry. Of course, this isn't a completely true picture; the two groups of forces can't be treated wholly separately—for there are elements in the business picture (credit for instance) which simultaneously affect the industry and its customers. However, for sake of simplicity I shall deal with the two groups separately. These comments are based on the assumption that we shall not be at war and that wartime controls will not be established.

First then as to the second group—relating to supply. Production of paper has been steadily increasing, and exceeded 21 million tons in 1947. Only by putting promptly in service new facilities as they were completed during the year was this volume attained. Obviously this increase required additional raw materials all along the line and broadly speaking these supplies were available. Actually in spite of high paper production, pulpwood inventories increased during 1947 almost 30 percent and over-all wood pulp inventories at pulp and paper mills had grown by about 200,000 tons or almost 35 percent. Secondary raw materials—chemicals, sizing, filler, etc. — while tight in spots were generally adequate.

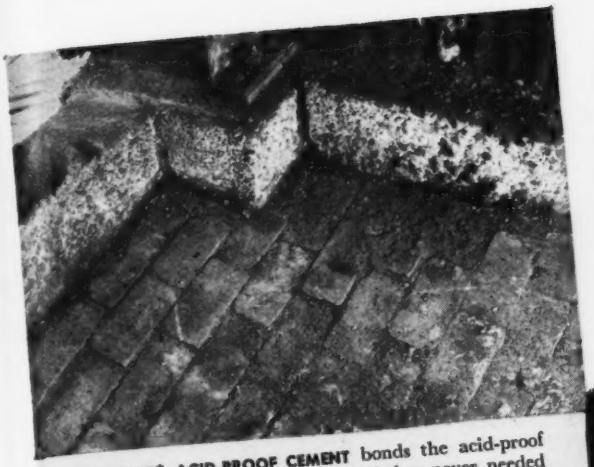
As the industry entered 1948 it was in the midst of an expansion program amounting to almost a million and three-quarter tons of annual paperboard and paper capacity. More than half of this was scheduled for completion during the first quarter with the balance scheduled throughout the remainder of the year. With these additions, aggregate capacity at the end of this year is estimated at more than 23.5 million tons on a six-day, 24-hour-a-day operating basis.

It is apparent, therefore, that if the industry were to operate at the same ratio to capacity as in 1947, it can produce in the neighborhood of 23 million tons of paper and paperboard this year. Overall pulpwood receipts in 1947 were close to 20,000,000 cords —enough to make 13,000,000 tons of pulp. In the light of high inventories at the year end and barring only weather interferences, I think the industry can well be expected to secure adequate pulpwood to meet dmands. If pulp imports again reach over 2 million tons, we could allow 700,000 tons for dissolving and other non-paper uses, and there still would be over 14.5 million tons for paper making and this would support production of 23 million tons. So there is ample reason to believe that 23 million tons of paper and paperboard can be made in 1948; and that with newsprint and other paper imports, the new supply, if required by demand, could reach the amazing total of 27 to 27.5 million tons or sufficient for an apparent per capita consumption of about 370 pounds.

However, before reaching any conclusions, a glance at inventories is justified. As you are no doubt aware, the American Paper and Pulp Association has conducted for some time a study of basic demand in conjunction with its other statistical series. Its studies indicated that at the beginning of 1947 inventories in the hands of mills and customers were close to a minimum, but that total production exceeded basic demand in 1947 and that the indicated inventory accumulation for a ten months' period was the equivalent of about two weeks' demand on the November base. This steady increase obviously poses the question as to how far accumulation can go before inventories become top heavy. Unfortunately past statistics are too sketchy to permit any positive statements.

However, recent Department of Commerce reports tend to support the view that, in your field at least, the growth in inventories, while noticeable, does not yet appear excessive. While based on a sample only, the Department's report indicates that the increase in sales since 1940 is almost twice the increase in inventories.

Most of you will recall the great bulge in inventories which occurred from the late summer-early fall of 1941 to the spring of 1942. You will also recall the fear stories emanating from government circles about that time forecasting near-future demand at anywhere from six to ten million tons in excess of the maximum production of which the industry was then thought capable. Obviously these statements added to demand so that inventories grew to a point where they were so top heavy that when accumulation stopped the drop in production was one of the sharpest in history. The APPA indexes indicate that that increase in inventories, in index figures, was more than twice the inventory



PENCHLOR* ACID-PROOF CEMENT bonds the acid-proof brick on this industrial floor which has never needed repair in 14 years of attack by H_2SO_4. Penchlor is one of Pennsalt's silicate type cements . . . chemical-setting, quick-hardening, thorough-curing . . . designed to resist a wide variety of acids.

PENNSALT CAUSPLIT* CEMENT was used in this tile lining to resist attack from acids and alkalies alternately. Causplit Cement is resistant to alkaline conditions and will also resist many acids.

CORROSION doesn't have a toe-hold here . . .

PENNSALT PRF CEMENT was installed 1 year ago in this industrial waste tank handling spent pickle liquors and alkaline cleaner solutions, and the joints are still in excellent condition. PRF Cement is a resin-type, quick-setting, cold-hardening cement designed to resist most alkalies, acids and solvents.

PENNSALT ASPLIT* CEMENT bonds the acid-proof brick in this continuous pickling tank, operating at 210°F. Built 8 years ago, the joints are still free from attack. Asplit Cement is a self-hardening resin cement of unusual strength and toughness, and high resistance to a wide variety of acids.

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of many types for Acids, Alkalies, Solvents

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If you have a problem in construction which involves acids, alkalies or solvents, you may find a practical and economical answer in Pennsalt Cements and Pennsalt technical service. Pennsalt has developed a superior line of corrosion-resistant cements to meet almost any corrosion situation . . . and will gladly cooperate with you in working out the technical details of the job. Write in full detail to Special Chemicals Division, Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.

accumulation which took place in 1947, and since on that occasion accumulation started from full shelves or at least from a situation of fairly normal inventories, all of the increase represented surplus inventory. I think it is quite doubtful that such inventory accumulation as has yet occurred could be truly denominated surplus inventory, even though we have no adequate base of reference to dtermeine an actually normal level. Generally, . I believe our total industry statistics, including those that lie in your field, leave much to be desired on this point.

From the figures that I have cited, it might well be assumed that further accumulation of inventories equal to that which occurred in 1947 merely bring us to approximately a 30-day supply and from most standpoints such a supply would not be called excessive. Newspaper publishers' inventories of newsprint, for instance, are more than 30 days. Yet they maintain that their inventories are close to bed-rock conditions, and regardless of what I said earlier, we know that newsprint still continues tight. Nevertheless we cannot overlook the fact that both demand and production have been running high with production higher than basic demand. If demand slackens off and production increases with increased capacity, inventories can accumulate even more rapidly than in the past year. However, if demand increases and production remains level, the period of relative scarcity could be prolonged.

Of course, an economically ideal situation would result if after reaching normal inventories customers would curtail buying to the extent necessary merely to meet current orders and maintain normal inventories, and if this took place, grade by grade the slow-down would be distributed over a period of months and would be less severe in its effect. I am not pessimistic, but I think we must recognize the human nature element in the equation. After inventory volume reaches a normal status, it will be difficult to resist the temptation to accumulate further if prices in general are still moving up in an inflationary spiral. It is in the general public interest for us to watch the signs and not permit that to occur.

So now let us take a look at the demand side. With the capacity increases which I have outlined and the probability of raw materials sufficient to operate at full six-day capacity, it is obvious that the main uncertainty in the supply-demand equation lies with the demand factor. This in turn will be determined by that group of forces I previously mentioned—those which affect general business conditions.

Paper demand is determined in the last analysis by the state of general business. Consumption has always increased as business activity increased and decreased as business activity declined. Statistical indexes over a long period of years have indicated that paper consumption is closely related to the activity in certain of the non-durable goods industries and from this fact has arisen the study of the basic demand for paper to which I have referred.

Forecasters will, of course, balance the probable behavior of strategic general factors against each other and arrive at a conclusion as to the probable future general trend of business. This doesn't mean that their forecasts will always come true. We have only to think back a very short time to remember a host of predictions from government sources as to unemployment after the war to realize that forecasting is a hazardous business. I do not, therefore, intend to make any forecast as to demand. I think, however, it may be of interest to consider what over-all consumption might be, over a substantial or long term period.

Apparent per capita consumption is production plus imports less exports. It, therefore, includes, at the top limit, inventory accumulations. The 1947 figure was 342 pounds per capita and we know that there was some inventory building in that figure. The amount of such accumulation is estimated at about 4 percent of 1947 apparent consumption.

It so happens that 4 percent also represents about the normal annual growth of the industry and, therefore, the 342 pounds per capita apparent consumption in 1947 could well prove to be the actual per capita consumption that will occur in 1948. 342 pounds per person for a population forecast at 145.4 million gives an estimated 25,000,000 tons over-all actual consumption forecast for 1948. After import and export allowances this would indicate the necessity for something over 21,000,000 tons domestic production for actual consumption. If we assume that another 4 percent increase would be necessary to restore inventories to a normal basis, this would mean domestic production in 1948 of something over 22,000,000 tons. An inflationary inventory movement would require more production and the deflation of demand through a slump in general business would call for less tonnage.

In 1948 in the light of increased capacities, the industry could operate at a production ratio of 95 percent of estimated year-end capacity and produce about 22,100,000 tons if there is no general slump in business; and this would result in satisfying a high level of demand while restoring inventories to normal. Obviously, since the operating ratio during the first quarter approximated 100 percent of revised capacity, inventories may be in the process of more rapid replacement than in 1947.

Nevertheless, I see no need to be pessimistic about the picture. An interesting analysis of paper consumption reduces it to the trend of apparent per capita consumption and the trend of population growth. Apparent per capita consumption has its own distinct pattern with a sharply upward long-term trend as compared with normal growth of population which is slow and steady. Of course, the recent spurt in population has had its effect on the consumption of paper, supporting a larger volume of consumption than was to have been expected from population forecasts made as recently as 1940; but the upward trend indicates an ever growing penetration of the use of paper throughout our economy. By using a projection of the trend line for apparent per capita consumption, a fairly reliable mean figure can be secured for 10 or 15 years in the future. For any particular year obviously the figure is subject to increase or decrease to conform to the swings of the business cycle.

Recent forecasts using the figures in this way have indicated that basic paper consumption in 1955 will be about 30,000,000 tons; that is 400 pounds per capita for a total population of 150,000,000 people. Allowing 5,000,000 tons for imports of paper, which is a substantial increase, this would indicate that domestic production could reach 25,000,000 tons or about 4,000,000 tons more than was produced in 1947. This figure allows for the top requirements at the peak of a business cycle. In view of its past history and particularly the tremendous expansion of the past two years, I think there is no doubt that the industry will be able to meet any such demand. But I think it is equally likely that some time before that date there may be greater question as to whether demand will permit anything like full running in the industry.

Earlier in this talk I referred to the changed situation that is facing us in the light of recent administration presentations; and that what I have had to say was based on the assumption that we would not be at war nor again subjected to war-time controls. I did not make that statement as a prognostication. I think that very few of us in the business world have adequate information upon which to make any forecast on that point. It does not seem to me that in all of the supposedly revealing pronunciamentos that have recently emanated from high places, there has been anything essentially new to anyone who has watched the trend of events. Of course, I come from "the sticks." My visits to such scenes of feverish activity as Washington and even New York, while regular, are not continuous. Yet the "news," so called, of recent days didn't seem to me to be new. So I cannot help expressing the feeling that often governments thrive on crises, emergencies—real or manufactured—natural or the result of faulty governmental policies; and I cannot, therefore, refrain from recalling a little history.

All of us who are concerned with

(Continued on page 36)

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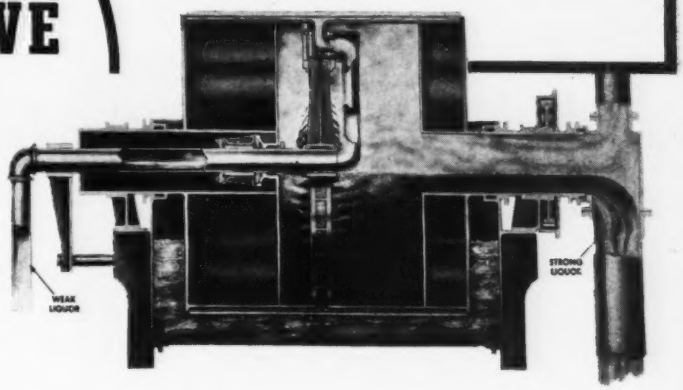
OLIVER RINGVALVE FILTER



We recommend the Oliver Ringvalve Filter for the following applications:

- **Sulphite, Sulphate or Soda Washing**
- **Bleach Washing**
- **Decker-Washing**
- **Deckering**
- **High Density Thickening**

We recommend its purchase for your mill not only because it has thoroughly proved its superiority but because it's not a "cramped" filter. There is plenty of space between drum and vat for pulp circulation. The vat is designed for "through the floor" installation.

And as a reminder of its operating features here are a few: wide submergence range; operable with barometric leg; low flow resistance; can take peak loads in stride; uniform sheet and high washing efficiency.

Yes, we recommend the Oliver Ringvalve for any of the operations noted above. Many mills are glad, today, they accepted our Ringvalve recommendations.

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IMPORTS

NEW YORK IMPORTS

WEEK ENDING APRIL 10, 1948

SUMMARY

Newsprint	6592 rolls
Sulphite Paper	51 rolls
Wrapping Paper	823 rolls
Drawing Paper	7 cs.
Filter Paper	18 cs.
Toilet Paper	4 cs.
Paperhangings	14 cs.
Wallpaper	3 cs.
Coated Paper	47 cs.
Tissue Paper	23 cs.
Packing Paper	70 bls.
Paper Serviettes	2 cs., 1 crate

NEWSPRINT

Madden Reeve Angel & Co., Inc., Mormacsaga, Abo-Turku, 1167 rolls.

(———), Mormacsaga, Abo - Turku, 223 rolls.

Montmorency Paper Co., Brigus, St. Johns, N. F., 1012 rolls; 2536 rolls (Washington, D. C.).

Madden Reeve Angel & Co., Inc., Mormacmail, Abo, 1082 rolls.

Pagel Horton & Co., Inc., Ranenfjord, Oslo, 572 rolls.

SULPHITE PAPER

Joe Salwen Paper Co., Ranenfjord, Oslo, 51 rolls.

WRAPPING PAPER

Jay Madden Corp., Mormacmail, Abo, 439 rolls.

Jay Madden Corp., Mormacsaga, Abo-Turku, 384 rolls.

DRAWING PAPER

H. Reeve Angel & Co., Inc., Whirlwind, London, 2 cs.

J. E. Bernard & Co., Whirlwind, London, 1 cs.

Green Kriegsman Paper Co., Washington, Southampton, 4 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., Whirlwind, London, 18 cs.

TOILET PAPER

(———), Whirlwind, London, 4 cs.

PAPERHANGINGS

C. A. Haynes & Co., Whirlwind, London, 14 cs.

WALLPAPER

Hudson Shipping Co., American Farmer, London, 3 cs.

COATED PAPER

F. P. Gaskell & Co., Elysia, Glasgow, 47 cs. (for cigarette tips).

TISSUE PAPER

B. F. Drakenfeld & Co., American Traveler, Liverpool, 23 cs. (gauze carbonizing).

PACKING PAPER

J. P. Heffernan Paper Co., Mount Mansfield, Genoa, 70 bls.

PAPER SERVIETTES

L. Bamberger & Co., American Traveler, Liverpool, 1 cs.

Gimbel Bros., Sibley Park, Liverpool, 1 cs.

(———), Sibley Park, Liverpool, 1 crate (crepe).

RAGS, BAGGINGS, ETC.

Castle & Overton, Inc., Steel Navigator, Alexandria, 100 bls. old jute rags.

J. J. Rozendall, Inc., Steel Navigator, Alexandria, 100 bls. old jute rags.

(———), Elysia, Glasgow, 72 bls. paper stock.

(———), American Traveler, Manchester, 86 bls. new cotton rags.

Cleveland Trust Co., American Traveler, Manchester, 17 bls. wool rags.

(———), Exporter, Leghorn, 73 bls. cotton rags.

Manufacturers Trust Co., Exporter, Genoa, 176 bls. old waste bagging.

Midwest Waste Material Co., Exporter, Genoa, 163 bls. bagging.

New England Waste Co., Terra Haute Victory, Bombay, 250 bls. cotton waste.

Brown Bros. Harriman Co., Terra Haute Victory, Bombay, 100 bls. old jute rags.

(———), Terra Haute Victory, Bombay, 334 bls. old jute rags.

E. J. Keller Co., Inc., Midland Victory, Antwerp, 102 bls. old waste bagging.

Tice & Lynch, Falstria, Copenhagen, 18 bags paper waste.

J. Eisenberg & Son, Agwidale, Havana, 49 bls. cotton rags, 3 bls. rayon rags.

D. Benedetto, Inc., Agwidale, Havana, 69 bls. rags.

E. J. Keller Co., Inc., Hoegh Silverstar, Bombay, 135 bls. old jute bagging.

New England Waste Co., Hoegh Silverstar, Karachi, 979 bls. cotton linters.

New England Waste Co., Tampa, Buenos Aires, 129 bls. cotton waste, 114 bls. pickers.

Midwest Waste Material Co., Southstar, Antwerp, 62 bls. old bagging, 386 bls. bagging.

Schimmel Corp., Mount Mansfield, Bombay, 100 bls. cotton waste.

Brandwein Mazur Co., Mount Mansfield, Bombay, 200 bls. cotton waste.

Darmstadt Scott & Courtney, Mount Mansfield, Bombay, 110 bls. old jute rags.

Volkart Bros., Mount Mansfield, Bombay, 50 bls. cotton waste.

National City Bank, Mount Mansfield, Alexandria, 47 bls. old heavy bagging.

(———), Aardyk, Antwerp, 116 bls. flax waste.

Midwest Waste Material Co., Aardyk, Antwerp, 131 bls. jute bagging.

(———), Sibley Paper, Liverpool, 55 bls. wool rags, 20 bls. wool thread waste.

OLD ROPE

(———), Taybank, Calcutta, 130 bls. old hemp rope cuttings.

CASEIN

American Cyanamid Co., Argentina, Buenos Aires, 1000 bags.

GLUESTOCK

(———), Bowrio, Buenos Aires, 97 bls. fleshings, 45 bls. goat skin cuttings.

WOODPULP BOARDS

Jay Madden Corp., Mormacmail, Abo, 537 bls. (solid white).

National City Bank, Mormacsaga, Abo-Turku, 1130 bls. (solid white).

BOSTON IMPORTS

WEEK ENDING APRIL 10, 1948

Castle & Overton, Inc., Exporter, Leghorn, 265 bls. dark cotton rags.

H. Adlerstein, Mount Mansfield, Genoa, 270 bls. dark cotton rags.

PHILADELPHIA IMPORTS

WEEK ENDING APRIL 10, 1948

Tradesmans National Bank Trust Co., Exporter, Alexandria, 90 bls. old white cotton rags.

Jay Madden Corp., Mormacmail, Abo, 551 rolls newsprint, 319 rolls wrapping paper.

National City Bank, Mormacmail, Abo, 710 bls. prime unbleached kraft sulphate pulp.

(———), Mormacsaga, Abo - Turku, 724 rolls, 28 pkgs. wrapping paper.

Jay Madden Corp., Mormacsaga, Abo-Turku, 39 rolls wrapping paper.

National City Bank, Mormacsaga, Abo-Turku, 3590 bls. prime unbleached kraft sulphite pulp, 220 bls. prime unbleached kraft sulphate pulp.

BALTIMORE IMPORTS

WEEK ENDING APRIL 10, 1948

(———), Macalester Victory, Venice, 286 bls. rags.

National City Bank, Mormacmail, Abo, 855 bls. prime unbleached kraft sulphate pulp, 253 bls. prime unbleached strong sulphite pulp, 1092 bls. prime unbleached strong bleachable sulphite pulp.

Pagel Horton & Co., Inc., Mormacmail, Stockholm, 1021 bls. woodpulp.

Volkart Bros., Hoegh Silverstar, Bombay, 50 bls. cotton waste.

Pulp Sales Corp., Mormacmail, Abo-Turku, 1083 bls. prime unbleached sulphite pulp.

(———), Mormacmail, Abo - Turku, 627 rolls newsprint.

PHILADELPHIA IMPORTS

WEEK ENDING APRIL 3, 1948

H. Adlerstein, Examiner, Genoa, 66 bls. light cotton rags.

E. J. Keller Co., Inc., Exiria, Trieste, 424 bls. rags.

National Casein Sales Co., Mormacdawn, Buenos Aires, 1500 bags casein.

BALTIMORE IMPORTS

WEEK ENDING APRIL 3, 1948

Burnet Foreign Trading Corp., Fernmoor, Shanghai, 200 bls. cotton waste.

NORFOLK IMPORTS

WEEK ENDING APRIL 3, 1948

E. J. Keller Co., Inc., Hibbing Victory, Antwerp, 51 bls. bagging waste.

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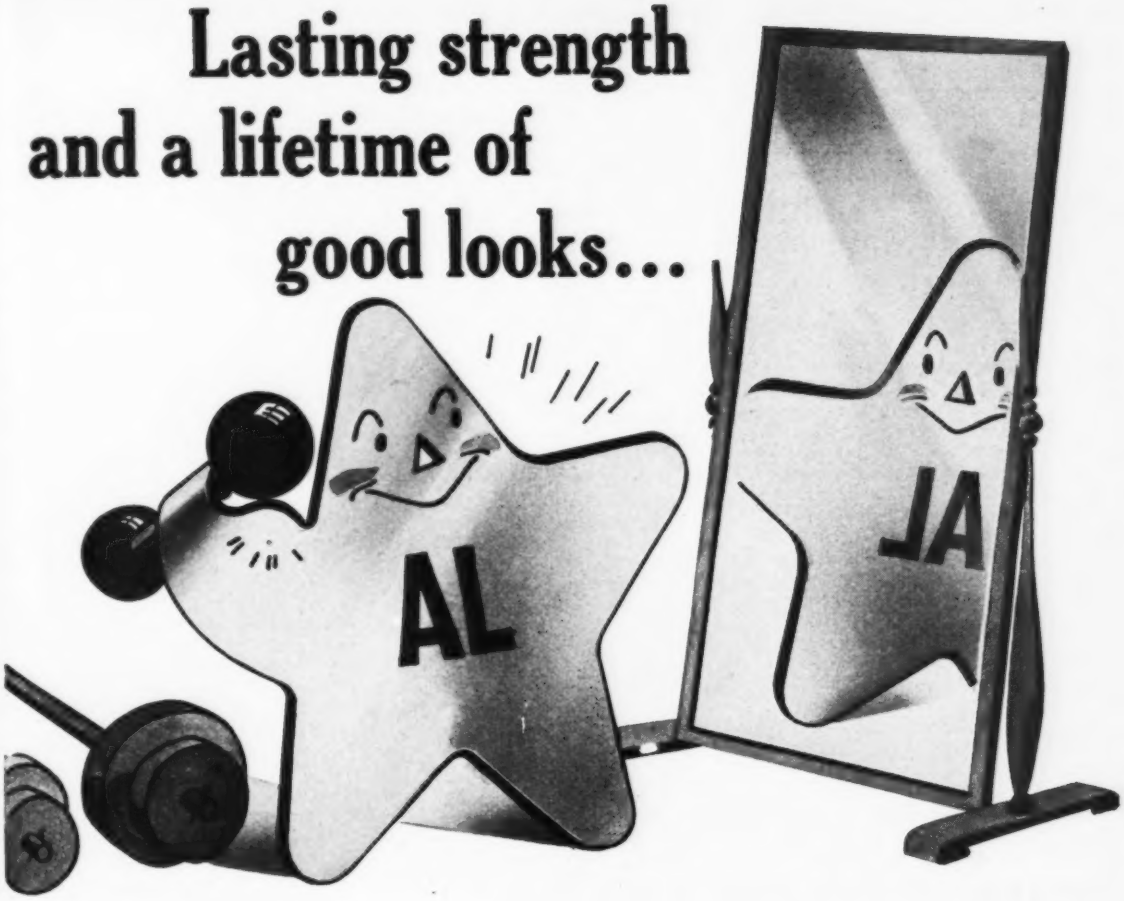

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TRENDS

Office of the PAPER TRADE JOURNAL.
Wednesday, April 14, 1948.

With production of paper, paperboard and products for the quarter ended March 31 approximately 5,500,000 tons (or one-quarter of the 1948 goal for the industry), with inventories replenished and demand somewhat less stringent, the seller's market is considered as waning.

Effect of the Economic Cooperation Administration is being watched for its reaction particularly on raw materials and chemicals. But grave concern is expressed for the outcome of the Italian election and its consequent effect on our government's plans for rearmament. The adoption of even a less imposing program than President Truman recommended would bring increased demand for paper to cover voluminous government paper work. Draft and equipment of man-power would result in a shortage of personnel and also in a shortage of pulpwood. Demand for clothing for uniforms would alter the condition ot the cottons market. And while the net result would be heightened demand for paper and its products, a mood of deep seriousness is reported particularly among war veterans in the industry as Time chalks off one day nearer the 18th and consequent Congressional action.

Wood Pulp

Reports reach us through *Svcnsk Pappersmasse Tidning* that a settlement is said to have been reached on conditions of Swedish pulp exports. "According to the new agreement which is not yet formally sanctioned, an amount of 50 and 20 kroner respectively per ton will be payable on all exports of cellulose and mechanical pulp, i.e., the same as during the previous period. The pulp market is still described as firm, and price-fixings have been fairly extensive made on the basis of old quotations. Some trade papers are expressing fears that the pulp market is facing a turning point, especially in view of the situation in the United States of America; but so far there are hardly any actual facts to support that view. Of the several pulp qualities, unbleached kraft pulp has been said to be weakening slightly. It would, however, be more correct to say that prices have to some extent been equalized by topping off the occasional excessive quotations, thus leveling down to those established by the leading producers. In this connection, it may be suitably pointed out that the exceptionally high quotations made very occasionally may be ascribed more to panicky purchases by paper mills that have not been able to cover their full requirements. Speaking generally it must be said that the sellers have observed moderation in their pricing and have not tried to profit unduly from the situation. The few excessively high prices have sometimes been traced to pulp consignments outside the regular business transactions which parcels have become objects of speculation.

"Pulp is still in exceedingly good demand and our chance of filling the full quantities are still restricted. Much will of course also depend on whether it will be possible to weather the financial crisis from which several countries are now suffering and which have been still more accentuated by recent political events."

Waste Paper

The supply situation in low bulky grades continues well in advance of consumer buying as mills appear to be drawing on inventories and purchasing scantily. Folded news, mixed, ledgers and heavy books appear in good volume with little activity reported. Old corrugated is in better demand with supplies not so heavy. Prices on all these varieties are holding firm. Demand continues strong for pulp substitute varieties with prices unchanged.

During the first quarter of the year, the Eastern Conservation Committee reports, eastern mills consumed 4 percent more waste paper than in the first quarter of last year, and 20 percent more than during the first quarter of 1946. This consumption included the same amount of news grades as last year, 20 percent more of old containers and 33 percent more of the better grades. Consumption of mixed grades was 12 percent behind last year or back to the 1946 level.

For the second quarter, it is estimated that one-third of the waste paper consumption will be mixed, about one-fourth news, and the balance will be corrugated and high grades. With mills now operating at capacity, it is not anticipated that waste paper consumption will increase until new machines come into production, but it is expected that mills will be purchasing for inventory where they are able to buy high quality, well-packed waste paper.

This demand for improved packing of waste paper was the keynote of the recent convention of the industry held in Boston when the problems facing packers of waste paper for domestic and export consumption were discussed in detail. Wartime emergencies and boom conditions are history, and the mills must now be provided with waste paper pack to meet the standards of classification, and dealers who can fulfill mill requirements are said to be selling more waste paper than ever before in the history of the industry. Particular stress was laid on the elimination of "border-line" packing and on the need for superior quality.

With funds now made available for export purchases, foreign inquiry is on the increase, and study of requirements for packing for export sale become a requirement, it was stated. The big objective of the industry for this year must be a determined effort on the part of consumers and dealers alike to bring all packings up to prewar levels for if consumers accept up-graded merchandise they are partially responsible. Without their cooperation the condition cannot be remedied. With an ample supply of most grades of waste paper available, the mills can require properly packed goods, and where dealers cooperate to maintain high standards of operation they contribute towards prosperity in the waste paper industry and improved relationships with the mills.

Rags

The period of watchful waiting which has characterized the new cuttings and rag markets for the past several weeks continues. Little purchasing of new cuttings is being done as the mills carry on a "sit-down strike" for lower prices so they can again compete with sulphite paper. Some small reductions in price are reported, but with the small supplies of new cuttings coming to the market, dealers have been able to maintain prices generally.

Abundant stocks of rag-content papers may acquire some stimulant through the ECA, but thus far paper mills have shown no desire to indicate their requirements of cuttings. Dealers sensing the stalemated condition talked at the recent convention of the need for rag prices to come down.

Another note struck at this meeting was the need for the rag trade to recognize the need for foreign trade in a world whose troubles have finally become ours if we are to survive and prosper. American public demand for more new and virgin material in their finished product, plus the development of synthetic fibers have contributed to the shrinking consumption of rags in the United States, with a consequent rag surplus developing. A challenge is therefore thrown to the rag industry to abolish "isolationist" policies and to prepare for foreign markets by building a solid foundation of confidence in quality pack and thus to enhance the respectability of the industry" and insure its survival.

Pricewise No. 1 roofing rags are softer at $1.90 to $2 with other grades in relative position. A few grades of old foreign rags have dipped 10c to 25c per hundred pounds. Old bagging reflects the market with advances of 50c per hundred pounds.

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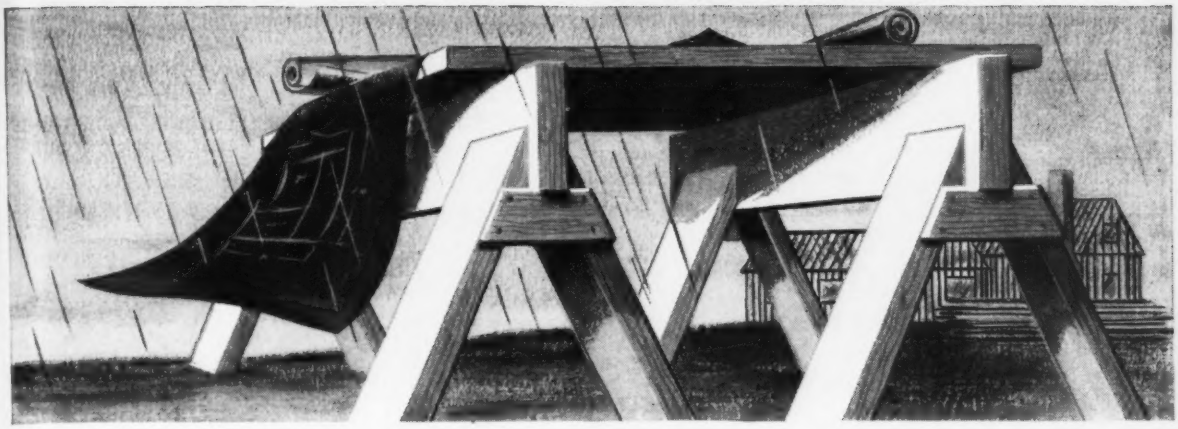

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P-426 BECKAMINE

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P-426 Beckamine imparts exceptional wet strength to many kinds of pulp, processed for a wide variety of end uses. It can be applied in beater, fan pump, head box or directly to the sheet at the size press. It cures quickly—between 60% and 80% of total wet strength will be realized as the paper comes off the drier. And it is exceptionally stable in storage. From every paper making standpoint it is the resin of choice. Write direct to the Sales Department at Detroit for further information.

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SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

PRICES

With the elimination of price controls on paper, pulp, rags and other materials, the quotations given below once more become indicative of trends in an open market. At the moment they can be of little more, for, while some volume business still is being done under contract at the figures given below, fluctuations representing special conditions are to varied and too frequent to permit prices to be given as representing a wholly stabilized market.

Paper

(Delivered New York)

Standard News, per ton—
Rolls, contract .... $93.00/$96.00
Sheets 102.50/109.00

Kraft—per cwt.—Carload Quantities
Zone A Deld. 40 lb. base wgt.
Superstandard Wrapping ..... $9.00/ —
No. 1 Wrapping 7.25/ 8.00
Standard Wrapping .. 6.50/ —
Standard Bag ..... 6.50/ —

Tissues—Per Ream 24x36 (480) 11 lb. Zone 1.
Wh. No. 1 Frd. .... $1.84/$2.00
Wh. No. 1 M. G. ... 1.94/ 2.00
Wh. No. 1½ ..... 1.60/ —
Wh. No. 2 ..... 1.75/ —
Kraft Anti-Tar ..... 1.65/ —
Kraft Unbl. ..... 1.85/ —
Manila No. 2 ..... 1.62/ —
Shred. Wh. No. 1 cwt. 1.10/ 1.50

Toilet—Per Case of 100 rolls—1 M Sheets.
Unbleached ..... $8.50/$10.00
Bleached 8.50/ 10.00

Paper Towels—Per Case of 3750—Zone 1.
Wh. Jr. M'tif'd 9¼x9½ .. $5.15
Br. Sr. M'tif'd 10x12 .... 3.60
Br. Jr. M'tif'd 9½x9¾ 3.10
Br. Jr. Sgl. fold 10x10¾ .. 3.15

Manila—per cwt.—C-l. f.a.
No. 1 Jute Tag ... $14.50/ —
Reg. Jute Manila . 13.25/$15.50
No. 1 Manila .... 9.75/ —

Boards, per ton—
Plain News ..... $92.50/ —
Filled News ..... 94.00/ —
Plain Chip ..... 90.00/ —
Sgl. Mla. J-d. Chip* 100.00/102.50
White Pat. coated* 120.00/ —
Kraft Liners 42 lb. 100.00/ —
Kraft Corr. .009 .. 105.00/ —
Binders Boards ... 126.00/ —
* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1:

Rag Content Bonds and Ledgers—White, 16 lb.

Bonds, per cwt.

	Carton	4 C't'n	Ton
100% Rag Ext. No. 1	$55.00	$50.80	$48.70
100% Rag ...	48.25	44.55	42.70
75% Rag	37.50	34.55	33.10
50% Rag	32.25	29.40	28.25
25% Rag	28.75	26.15	25.10

Ledgers, per cwt.

100% Rag Ext. No. 1	$55.00	$50.80	$48.70
100% Rag ...	48.25	44.55	42.70
75% Rag	37.50	34.55	33.10
50% Rag	32.25	29.40	28.25
25% Rag	28.75	26.15	25.10

Sulphite Bonds and Ledgers—White. 16 lbs.

Bonds, per cwt.

No. 1	$21.25	$19.25	$18.50
No. 2	20.25	18.30	17.55
No. 4	19.25	17.55	16.85

Ledgers, per cwt.

No. 1	$21.75	$19.65	$18.85
No. 2	20.75	18.75	18.05
No. 4	20.00	18.10	17.35

Free Sheet Book Papers—White, Cased Paper

(Per cwt.)	Case	Ton
No. 1 Glossy Coated .	20.40	$19.50
No. 2 Glossy Coated .	19.15	18.30
No. 3 Glossy Coated .	18.40	17.60
(Per cwt.)	Case	Ton
No. 1 Antique (Watermarked)	$15.90	$15.15
No. 2 Offset	15.15 to 17.90	14.60 to 17.10
A Grade E. F.	14.90	14.25
A Grade S. & S. C. .	15.40	14.65
B Grade E. F.	13.90	13.30
B Grade S. C.	14.40	13.70

Wood Pulp

Domestic mill contract prices delievered with varying freight allowances.

	Per Short ADT
Groundwood	$80.00/$81.00
Unbleached Sulphite .	124.00/ —
Bleached Sulphite ...	125.00/135.00
Bleached Soda	130.00/ —
Bleached Sulphate ...	175.00/185.00
Unbleached Sulphate Northern	125.00/155.00
Unbleached Sulphate Southern	130.00/145.00

Canadian Quotations

Prices delivered with varying freight allowances unless otherwise specified:

	Per Short ADT
Reg. No. Kraft	125.00/ —
Unbleached Sulphite .	125.00/126.00
Bleached Sulphite ...	125.00/135.00
Glassine Unbleached Sulphite (no freight allowance)	120.00/ —
Bleached Soda	130.00/ —
Groundwood	80.00/ 85.00
Sideruns Pulping News	80.00/ —
Hardwood and Specialty Grades	Nominal

Swedish Quotations

On dock, Atlantic Ports

Bleached Kraft	185.00/195.00
Bleached Sulphite ...	185.00/195.00
Unbleached Sulphite .	155.00/175.00
Unbleached Kraft ...	147.50/165.00

Finnish Quotations

On dock, Atlantic Ports

	Per Short ADT
Bleached Sulphite ...	$187.50/ —
Unbleached Sulphite .	155.00/157.00
Unbleached Sulphate	147.50/ —

New Domestic Cotton Cuttings

(F.O.B. Shipping Point Plus Dealer's Commision)

White Shirt	$12.00/$12.50
Unbleached Muslin ...	12.00/ 12.50
Light Silesias	9.00/ 9.25
White Back Blue Overalls	9.00/ 9.50
Blue Overalls	8.00/ 8.25
Fancy Shirt	6.00/ 6.25
Light Percales	8.50/ 8.75
Light Prints	7.50/ 7.75
No. 1 Washables	5.00/ 5.25
Bleachable Khaki	7.50/ 8.00
Unbleachable Khaki ..	6.50/ 7.00
Cottonades	5.50/ 5.75

Old Domestic Cotton Rags

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.
No. 1 Whites Repacked	$5.50/ $6.00
No. 1 Whites Miscellaneous	4.50/ 5.00
No. 2 Whites Repacked	3.50/ 3.75
No. 2 Whites Miscellaneous	3.00/ 3.50
Blue Overalls	3.75/ 4.00
Thirds and Blues Repacked	3.25/ 3.50
No .1 Roofing Rags ..	1.90/ 2.00
No. 2 Roofing Rags ..	1.75/ 1.85
No. 3 Jute Bagging ..	1.60/ 1.75
No. 4 Brussels and hard back carpets ..	1.65/ 1.75
No. 5A Roofing Rags	1.65/ 1.75

New Foreign Cotton Cuttings

(Prices to Mill, F.O.B. Dock, N.Y.)

	Per 100 lbs.
New Dark Cuttings ..	$5.50/ $5.75
New Mixed Cuttings ..	6.25/ 6.50
Light Silesias	9.25/ 9.50
Light Flannelettes	9.25/ 9.50
New White Cuttings ..	12.00/ 13.00
New Unbleached Cuttings	12.25/ 13.00
Fancy Shirt Cuttings .	6.50/ 7.00
Light Prints	7.75/ 8.00
Bleachable Khaki, No. 1	7.00/ 7.50
Unbl. Khaki, No. 1 ..	6.25/ 6.75

Old Foreign Rags

(Prices to Mill, f.o.b. dock, N.Y.)

	Per 100 lbs.
No. 1 White Linens ..	$14.00/$16.00
No. 2 White Linens ..	12.00/ 13.00
No. 3 White Linens ..	8.00/ 9.00
No. 4 White Linens ..	8.00/ 9.00
No. 1 White Cottons ..	8.00/ 10.00
No. 2 White Cottons ..	7.00/ 8.00
No. 3 White Cottons ..	6.00/ 6.50
No. 4 White Cottons ..	4.00/ 4.50
Extra Light Prints ...	6.50/ 7.00
Old Light Prints	4.50/ 5.00
Med. Light Prints	3.75/ 4.25
Dutch Blue Cottons ...	5.25/ 5.50
Checks and Blues	4.00/ 4.25
Linsey Garments	2.50/ 2.65
Dark Cottons, European	2.40/ 2.50
Dark Cottons, Egyptian	3.25/ 3.50
Old Shopperies	2.20/ 2.30
New Shopperies	2.40/ 2.50

Bagging

(Prices to Mill, f.o.b. N.Y.)

	Per 100 lbs.
Foreign Gunny, No. 1	$6.50/ $7.00
Domestic Gunny, No. 1	6.75/ 7.25
Heavy Wool Tares ...	6.25/ 6.50
Heavy Wool Tares ...	6.00/ 6.25
No. 1 Scrap Bagging ..	5.50/ 5.75
Roofing Bagging	1.75/ 2.00
Foreign Manila Rope ..	6.00/ 6.75
Domestic Manila Rope	6.50/ 6.75
Jute Strings	5.00/ 5.25
No. 1 Sisal Strings ..	5.25/ 5.50
Mixed Strings	1.75/ 2.50

Waste Paper

Base Prices to Mills for Average Packings
(Dollars Per Ton)
F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut	$155.00/$165.00
No. 1 Hard White Envelope Cuts ...	145.00/ 155.00
No. 1 Hard White Shavings, unruled	145.00/ 155.00
No. 1 Hard White Shavings, ruled ..	110.00/ 130.00
Soft White Shavings, one cut	145.00/ 155.00
No. 1 Soft White Shavings	135.00/ 145.00
Soft White Shavings, Misc.	125.00/ 135.00
No. 1 Fly Leaf Shavings	45.00/ —
No. 1 Groundwood Fly Leaf Shavings ...	35.00/ —
N. 1 Heavy Books & Magazines	25.00/ 26.00
Mixed Books	15.00/ 18.00
No. 1 White Ledger	75.00/ 80.00
Manila Tab. Cards .	95.00/ 100.00
New Manila Envelope Cuttings, one cut .	100.00/ 110.00
New Manila Envelope Cuttings	65.00/ 75.00
Extra Manilas	25.00/ 30.00
Mixed Kraft, Env. & Rag Cuttings	75.00/ 85.00
Kraft Envelope Cuttings	110.00/ —
Triple Sorted, No. 1 Brown Soft Kraft	65.00/ 75.00
New Kraft Corrugated Cuttings ...	70.00/ 75.00
No. 1 Assorted Old Kraft	50.00/ 55.00
New Jute Corrugated Cuttings	27.00/ —
Old 100% Kraft Corrugated Containers	35.00/ 40.00
No. 1 News	14.00/ 15.00
No. 1 Mixed Papers.	11.00/ 12.00
Box Board Cuttings .	— / —
White Blank News .	75.00/ 85.00
Overissue News	20.00/ 21.00
Old Corrugated	22.00/ 24.00
Mill Wrappers	22.00/ 24.00

Twines

All Prices Nominal, F.o.b. Mill

(Soft Fiber)

Coarse Polished— India	.33¼/ .35
Fine India	.38¼/ .42½
Fine Polished	
Unpolished— Paper Makers	.28½/ .30½
Tube Rope	.29 / .31½
Wrapping	.32 / .35¾
Cotton	.63¼/ .66¾

(Hard Fiber)

Mex. Sisal	.21 / .27
Manila (Reprocessed)	.30 / .32

(American Hemp)

Polished Hemp	.36¼/ .60
Unpolished	.32¼/ .54

PHILADELPHIA

Domestic Rags (New)

(F.O.B. Eastern Shipping Point)

Shirt Cuttings— New White No. 1	.11 / .12
New White No. 2	nominal
Light Silesias	.07½/ .08
Black Silesias, soft	.06½/ .07
New Unbleached ..	.10½/ .11¼
Washable Prints ..	.06½/ .07
Washable No. 1 ..	.05 / .05½
Blue Overall	.07½/ .08
Cotons—According to grades—	
Washable Shredding	.03½/ .04
Fancy Percales ..	.06¾/ .07¼
New Black Soft ..	nominal
Khaki Cuttings— Unbleachable Cotton Cuttings ...	.06 / .06½
Bleachable Cotton Cuttings	.07 / .07½
Men's Corduroy ..	.05½/ .06
Ladies' Corduroy .	.05 / .05½
Cottonades	.05½/ .06

Domestic Rags (Old)

(F.O.B. Eastern Shipping Point)

White No. 1 —Repacked	4.50 / 5.00
Mixed White	4.00 / 4.25
White No. 2—Repacked	3.50 / 3.75
Thirds and Blues— Miscellaneous	2.25 / 2.50
Repacked	2.75 / 3.00
Roofing Stock— Foreign No. 1 ..	nominal
Domestic No. 1 ..	1.85 / 1.90
Domestic No. 2 ..	1.75 / 1.80
Roofing Bagging ..	1.65 / 1.70
Old Manila Rope ..	6.25 / 6.50

Bagging

(F.O.B. Eastern Shipping Point)

Gunny No. 1— Foreign	nominal
Domestic	4.75 / 5.25
No. 1 Clean Bright— Sisal Strings	.04½/ .05
No. 2 Clean Bright— Sisal Strings	.03½/ .04
Sisal Jute	.02¾/ .03
Scrap— No. 1	5.00 / 5.50
No. 2	2.50 / 3.00

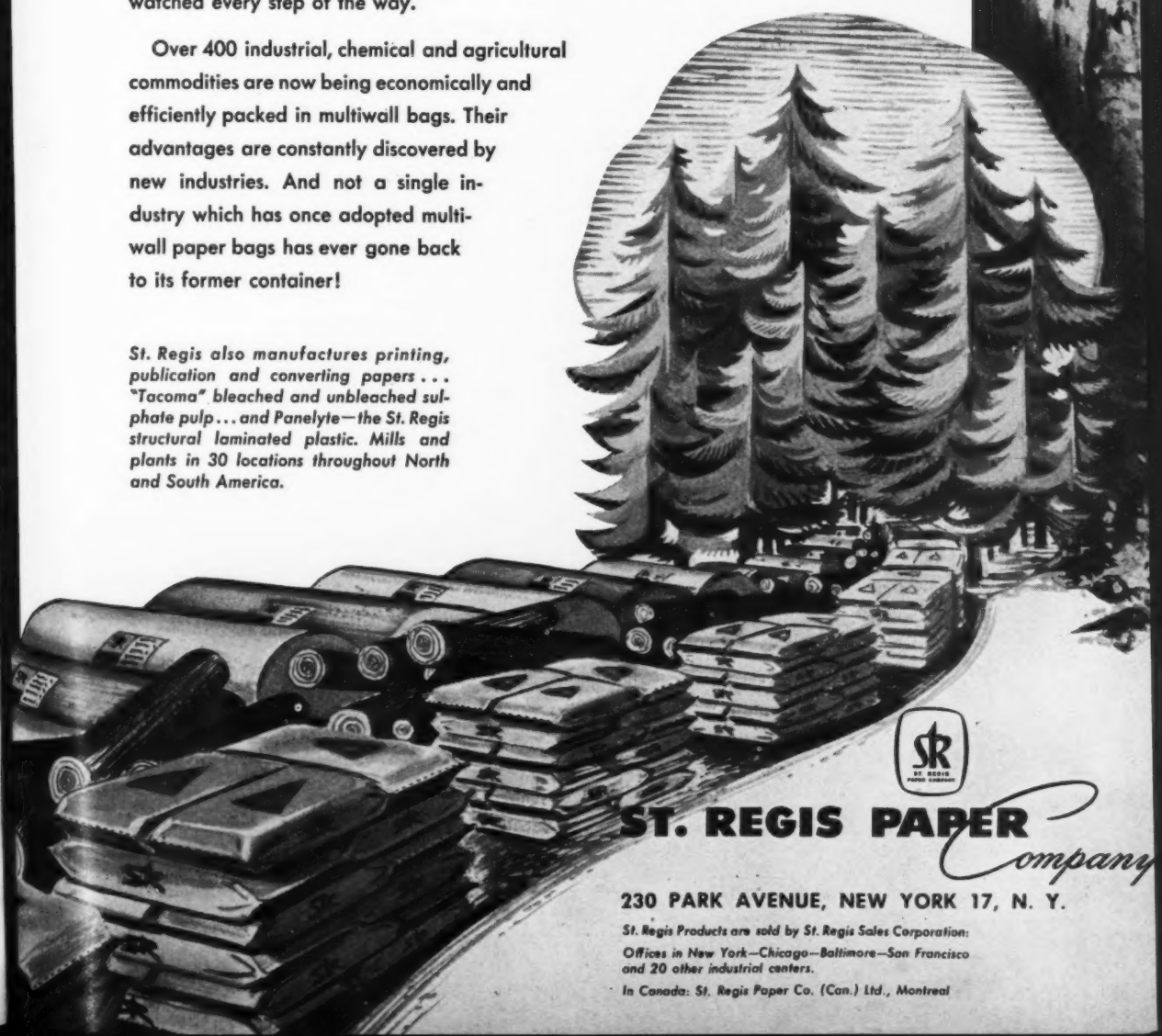
Contents ... UNLIMITED

MADE of strong, protective kraft paper, the multiwall bag guards the fundamentals of life itself! For its contents feed people and livestock, build homes and the roads that connect them, enrich the soil and sow it to renewed bounty.

Here at St. Regis multiwall bags are produced by controlled manufacturing. Much of the pulp is made from our own trees... much of the kraft paper from our own pulp. Thus quality is watched every step of the way.

Over 400 industrial, chemical and agricultural commodities are now being economically and efficiently packed in multiwall bags. Their advantages are constantly discovered by new industries. And not a single industry which has once adopted multiwall paper bags has ever gone back to its former container!

St. Regis also manufactures printing, publication and converting papers... "Tacoma" bleached and unbleached sulphate pulp... and Panelyte—the St. Regis structural laminated plastic. Mills and plants in 30 locations throughout North and South America.



ST. REGIS PAPER *Company*

230 PARK AVENUE, NEW YORK 17, N. Y.

St. Regis Products are sold by St. Regis Sales Corporation: Offices in New York—Chicago—Baltimore—San Francisco and 20 other industrial centers.

In Canada: St. Regis Paper Co. (Can.) Ltd., Montreal

Wool Tares, heavy ..	4.75	/ 5.00
New Burlap Cuttings	6.00	/ 6.50

Old Papers

(F. o. b. Phila.)
Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00/	$115.00
No. 1 Hard White Shavings, unruled .	100.00/	—
Soft White Shavings, One cut	90.00/	95.00
White Blank News .	75.00/	—
Soft White Shavings	80.00/	—
No. 1 White Ledger	85.00/	90.00
Ledger, Colored	70.00/	72.00
No. 1 Heavy Books & Magazines	24.00/	26.00
Overissue Magazines	nominal	
New Manila Envelope Cuttings	80.00/	—
No. 1 Assorted Old Kraft	60.00/	65.00
No. 1 Mixed Paper .	11.00/	12.00
Box Board Cuttings .	10.00/	11.00
Kraft Corrugated Cuttings	90.00/	100.00
Old Corrugated	24.00/	26.00
Overissue News	20.00/	22.00
No. 1 News	13.00/	15.00

BOSTON

Old Papers

(F. o. b. Boston)
Mill Prices, Baled

No. 1 Hard White Shavings, unruled .	6.25	/ 6.75
No. 1 Hard White Shavings, ruled ..	6.00	/ 6.50
Soft White Shavings, Misc.	6.00	/ 6.25
No. 1 Fly Leaf Shavings	—	/ —
No. 2 Fly Leaf Shavings	4.25	/ —
No. 1 Groundwood Fly Leaf Shavings	1.75	/ 2.00
No. 2 Groundwood Fly Leaf Shavings	1.50	/ 1.75
Mixed Colored Shavings	2.00	/ 2.25
New Manila Envelope Cuts, one cut	4.50	/ 4.75
Hard White Envelope Cuts, one cut	7.00	/ —
Triple Sorted No. 1 Brown Soft Kraft	3.75	/ 4.00
Mixed Kraft Env. & Bag Cuttings	4.00	/ 4.25
Kraft Envelope Cuttings	5.00	/ 5.50
No. 1 Heavy Books & Magazines	1.75	/ —
New Manila Envelope Cuttings, one cut .	—	/ —
New Manila Envelope Cutings	4.00	/ 4.25
White Tabulating Cards	5.00	/ —
Groundwood Tabulating Cards	1.50	/ 1.75
White Blank News .	2.25	/ 2.50
No. 1 Assorted Old Kraft	3.50	/ 4.00
No. 1 Mixed Paper .	.60	/ .65
Overissue News	.90	/ 1.00
No. 1 News	.70	/ .75
Box Board Cuttings .	.60	/ .70
New Corrugated Cuttings, Kraft	2.75	/ 3.00
Old Kraft Corrugated Containers ..	2.00	/ 2.25
Old Corrugated Containers	1.25	/ 1.30
Jute Corrugated Cuttings	1.07½/	—
Paper Strings	2.00	/ 2.25

Bagging

(F. o. b. Boston)

Gunny Bagging—		
Foreign	—	/ 4.75
Domestic	—	/ 4.75
Sisal Rope No. 1 ..	6.00	/ —
Sisal Rope, No. 2 ..	5.50	/ —
Mixed Rope	5.25	/ —
Mixed Strings	2.00	/ 2.50
Transmision Rope—		
Foreign	nominal	
Domestic	3.00	/ 3.50
Manila Rope—		
Foreign	nominal	
Domestic	6.25	/ —
Soft Jute Rope	5.00	/ 5.25
Jute Carpet Threads	6.00	/ —
Bleachery Burlap	8.50	/ 9.00
Scrap Burlap—		
Foreign	—	/ 4.75
Domestic	—	/ 4.87½
South America	5.25	/ —
Wool Tares		
Foreign	4.75	/ —
Domestic	4.75	/ —
Asst. Wool Pouches .	5.00	/ 5.25
New Zealand Wool Pouches	5.25	/ 5.50
New Burlap Cuttings	6.00	/ 6.50
Heavy Baling Bagging	5.25	/ 5.75
Paper Mill Bagging .	3.50	/ 3.75
No. 1 Roofing Bagging	1.75	/ —

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—		
New Light Prints .	.07½/	—
Fancy Percales ..	.08	/ —
New White No. 1 .	.11	/ .11¾
New Light Flannelettes	.08	/ .08½
Canton Flannels, Bleached	.10	/ .11
Underwear Cutters, Bleached	.11½/	—
Underwear Cutters, Unbleached	.11	/ .12
Silesias No. 1	.08	/ .08½
New Black Silesias .	.04½/	—
Red Cotton Cuttings	.05	/ —
Blue Overalls	—	/ .08½
Soft Unbleached	.11	/ .12
Blue Cheviots	.08½/	.09
Fancy	.06	/ —
Washable	.06	/ —
Khaki Cuttings	.06½/	.07½
Corduroy	.03½/	—
Men's Corduroy	.04½/	—
Ladies' Corduroy	.04	/ —
Khaki Canvas	—	/ .06
B. V. D. Cuttings ..	.11½/	—

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—		
Repacked	3.80	/ —
Miscellaneous	3.20	/ —
White No. 2—		
Miscellaneous	2.65	/ —
Twos and Blues, Repacked	2.20	/ —
Old Blue Overalls ..	2.25	/ 2.50
Thirds and Blues, Repacked	2.20	/ —
Miscellaneous	1.80	/ —
Black Stockings	3.50	/ 4.00
Roofing Stock—		
No. 1	1.85	/ —
No. 2	1.75	/ —
No. 3	1.65	/ —
No. 4	1.65	/ —
No. 5, Quality A.	1.35	/ —
Quality B.	1.20	/ —
Quality C.	.95	/ —
Old Manila Rope	6.00	/ —

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)
Mill Prices, Baled

Shavings—		
No. 1 Hard White Envelope Cuts, one cut	$150.00/	—
No. 1 Hard White Shavings, unruled	140.00/	—
No. 1 Soft White Shavings	120.00/	—
No. 1 White Ledger .	85.00/	—
No. 1 Heavy Books & Magazines	35.00/	—
White Blank News .	80.00/	85.00
Mixed Kraft Env. & Bag Cuttings	90.00/	110.00
No. 1 Assorted Old Kraft	35.00/	—
Overissue News	24.00/	—
No. 1 News	21.00/	—
No. 1 Mixed Paper .	13.00/	—
Old Corrugated	26.00/	—
Mill Wrappers	17.00/	—

MARKETS

BLANC FIXE—Market unchanged. Prices firm. Pulp is currently quoted at $85 in bags, car lots at works, 6 cents per lb., l.c.l., deld.; by-product $75 per ton, car lots at works, 6 cents per lb., l.c.l., deld.

BLEACHING POWDER — Supply adequate. Delivery good. Prices range from $3.75 to $4 per 100 pound drums, l.c.l. works.

CASEIN—Domestic and import prices firm on inactive market. Domestic flush season delayed until late April with light supply expected. Current prices on processed acid precipitated casein at 31 to 33 cents per pound for domestic grades and 28¾ to 30¾ cents for imported grades, f.o.b. shipping point.

CAUSTIC SODA — Though no cutbacks are reported, coal strike has worsened supply. Solid caustic is reported at $2.85 per cwt.; flaked and ground is quoted at $3.25 per cwt. in 400 pound drums, $3.75 to $4 per cwt. in 100 pound drums—car lots at works; liquid 50 percent in tank cars at $2.25 per cwt.; liquid 73 percent in tank cars at $2.35 per cwt., at works.

CHINA CLAY—Domestic grades and imported in good supply. Filled is $9 to $11.50 per ton, car lots; coating clay is $14 to $22. Imported clay quotation, short tons, $16 to $35, export warehouse.

CHLORINE — Supply condition generally unchanged, though spotty improvement is noted. Currently quoted at $2.25 per cwt. in single unit tank cars, at $2.55 to $3.75 per cwt., in multi-unit tank cars, f.o.b. works.

ROSIN—Active export inquiry. Domestic buying improving. New crop is tardy. Gum rosin in drums per 100 pounds net in car lots, f.o.b. Savannah: B, $6.50; G, H, I, K, $6.88; wood rosin, per 100 pounds net, car lots, f.o.b. Savannah: B, $4.50 to $5, FF, $5.50 to $6.

ROSIN SIZE—Seventy percent, gum and pale wood grades. Supply ample. Demand good. Tank cars $5.75 to $6, f.o.b. southern shipping point.

SALT CAKE—Demand continues ahead of supply with slight improvement in shipments. Prices unchanged. Domestic salt cake is quoted at $20 to $26.

SODA ASH — No easing of strong demand and tight supply. Deliveries behind schedule. Current prices, car lots, per 100 pounds; in bulk, $1.10; in paper bags, $1.30; and in barrels, $1.70.

SODIUM BICARBONATE—Strong demand with supply somewhat tighter. Reported as $1.85 per cwt. paper bags, carload lots.

STARCH—Supply plentiful. Demand easier. Pearl grade quoted at $6.96 per 100 pounds; powdered starch at $7.07 per 100 pounds; car lots, New York.

SULPHATE OF ALUMINA—Prices unchanged. Supply steady. The commercial grades are quoted at from $1.15 to $1.30 per 100 pounds, in bags, car lots, f.o.b., works. Iron free is $2 per 100 pounds in bags, car lots, at works.

SULPHUR—Supplies ample. Prices unchanged. Annual contracts are quoted at $16 to $18 per long ton, f.o.b. mines; the price f.o.b. at Gulf ports is $17.50 to $19.50 per long ton.

TALC — No change in domestic market. Demand far in excess of supply. Domestic grades are currently quoted at $23 per ton in paper sacks, f.o.b. mills; Canadian at $35 and up per ton. All prices in car lots.

TITANIUM DIOXIDE—Market unchanged. Extremely tight supply. No early easing seen in situation. Shipments on allocation. Anastase 17½c lb. carload lots, 18-18½c l.c.l., rutile, 19½c lb. carload lots, 20-20½c l.c.l.; 50-lb. bags, f.o.b. plant, minimum freight allowance.

For Exceptional COLORING POWER at Very Low Cost you need Du Pont SOLUBLE BLUE PB-6-D

HERE'S a pigment with very high coloring power, which is very economical for coloring paper in the beater.
It's Du Pont Soluble Blue PB-6-D—a form of Iron Blue—so processed as to give quick and complete dispersion in water.

Soluble Blue PB-6-D has excellent lightfastness. This shows to good advantage in blotting paper, twisting paper, lining stock . . . and any beater applications where a low-cost blue with good light resistance is required.

PB-6-D is standardized for color and strength in beater paper coloring.
And you can count on it for uniformity.

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. . . THROUGH CHEMISTRY

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N.P.T.A. Elects Luff As President

(Continued from page 26)

the manufacture or distribution of paper fully realize how dependent civilization is upon our industry. Because it is so much a part of our daily lives, we wonder why this is not apparent to all. You will all recall that during the critical days of 1943 it became necessary for a delegation to visit Mr. Donald Nelson, then head of W.P.B., to outline to him the industry position and the increasing difficulties the war effort might encounter unless there was a more realistic attitude toward our industry; and how he issued a public statement regarding the vital character of our industry—that it had not been realized before because everybody takes paper for granted just as they do air and water.

In reciting this history I do not mean to imply that if the foreign situation becomes more critical, our industry should ask or expect preferred treatment. Its maximum expectation should be only for that treatment necessary to permit it to perform its essential function in our economy.

But to attain that end it must be prepared to do its part; including willingness once more to supply the personnel needed to assist in the functioning of all those agencies, governmental and nongovernmental, whose patriotic, unselfish service is needed in any defense preparation or war effort. For of one thing I think we can be sure.

As we intensify our military preparation—and certainly under present world conditions America must be strong—we can be equally certain that there will be an intensification of efforts to reimpose all manner of government controls necessary or unnecessary. In fact, one phenomenon of American life today is to see the number of people of apparent complete intellectual probity, supposedly thorough believers in freedom, who demand just a little control here and a little more control there and more powers for centralized government whenever one of the intricate gears of our economic system breaks a cog or lacks a little grease. We can, therefore, be certain that we face a period in which complete if not undue publicity will be given to every proposal for government control as a panacea to meet every problem.

If controls come, then—if you haven't already done so—you can just forget everything that I have said regarding any given level of production or our ability to meet high and sustained demand. For even if those controls do not result in shortages in the most critical fields, it will negate all history if they fail to result in reduced production.

In conclusion I would recall to you Walter Reuther's testimony before a Senate committee some two months ago in which he denounced alleged cut-backs in textiles, reduced shoe production, inadequacy of steel expansion and charged that furnaces were being shut down, as he put it, "to get control over scrap prices."

In the light of the record no one can properly charge that our industry has been contributing to too high prices by holding down production.

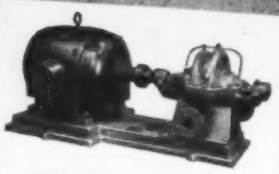
Being a perennial optimist, I think, given a minimum of controls, our industry will achieve whatever goals are set and, without any material hardship to anyone due to short supply, will meet all demands that are likely to be made upon it.

Production Executives to Confer at AMA Meeting

CHICAGO — Representatives of 800 manufacturing companies throughout the country will confer at a two-day American Management Association meeting, opening May 13 in Chicago, on the problems of providing better tools, equipment, methods and training for employees. The conference, being arranged under the supervision of George S. Dively, president and general manager, Harris-Seybold Company, Cleveland, and AMA vice-president in charge of the Production Division, will also discuss improved selection and training of executives, supervisors and workers as a means of meeting new standards of costs, keener competition and improved quality.

CLEAR LIQUID PUMPS
IN WIDE RANGES OF CAPACITY AND HEAD
Double Suction, Single and Two Stage Centrifugal
Axial and Mixed Flow, Deep Well Turbine

DOUBLE SUCTION
For a wide range of applications in general water supply and clear liquid transfer. Split case, ball bearing design. Enclosed type, bronze impeller with all water passages hand finished and exterior surfaces machined. Capacities from 50 to 7000 GPM. Heads from 25 to 250 feet. *Send for Bulletin No. 248.*



TWO STAGE CENTRIFUGAL
For water and clear liquid booster service. Split case, ball bearing design. Passage from first to second stage entirely within casing, reducing friction losses to minimum. Back-to-back, single suction, bronze, enclosed impellers. Capacities from 50 to 1500 GPM. Heads from 50 to 450 feet. *Bulletin No. 246.*

SINGLE STAGE CENTRIFUGAL
A general all-purpose transfer pump for lower heads in capacities from 50 to 550 GPM. Enclosed impeller, ball bearing design with renewable cover packing box and (optional) wearing rings. For liquids other than water, interchangeable contact parts of special alloys can be furnished. *Bulletin No. 251.*

AXIAL FLOW
A large volume, low lift, submerged pump producing from 500 to 10,000 GPM at heads from 5 to 25 feet. Dilution of lubricant, and corrosion or abrasion of bearing surfaces by seepage of pumped liquid into lower bearing is prevented by an exclusive (patented) vacuum arrangement in the propeller that relieves high pressure on the grease seal. Designed for drainage, irrigation, primary municipal pumping, and dewatering. *Write for details.*

ENGINEERING SERVICE—Our engineering staff is well qualified to cooperate with consulting and operating engineers in the selection of pumping equipment to meet individual needs.

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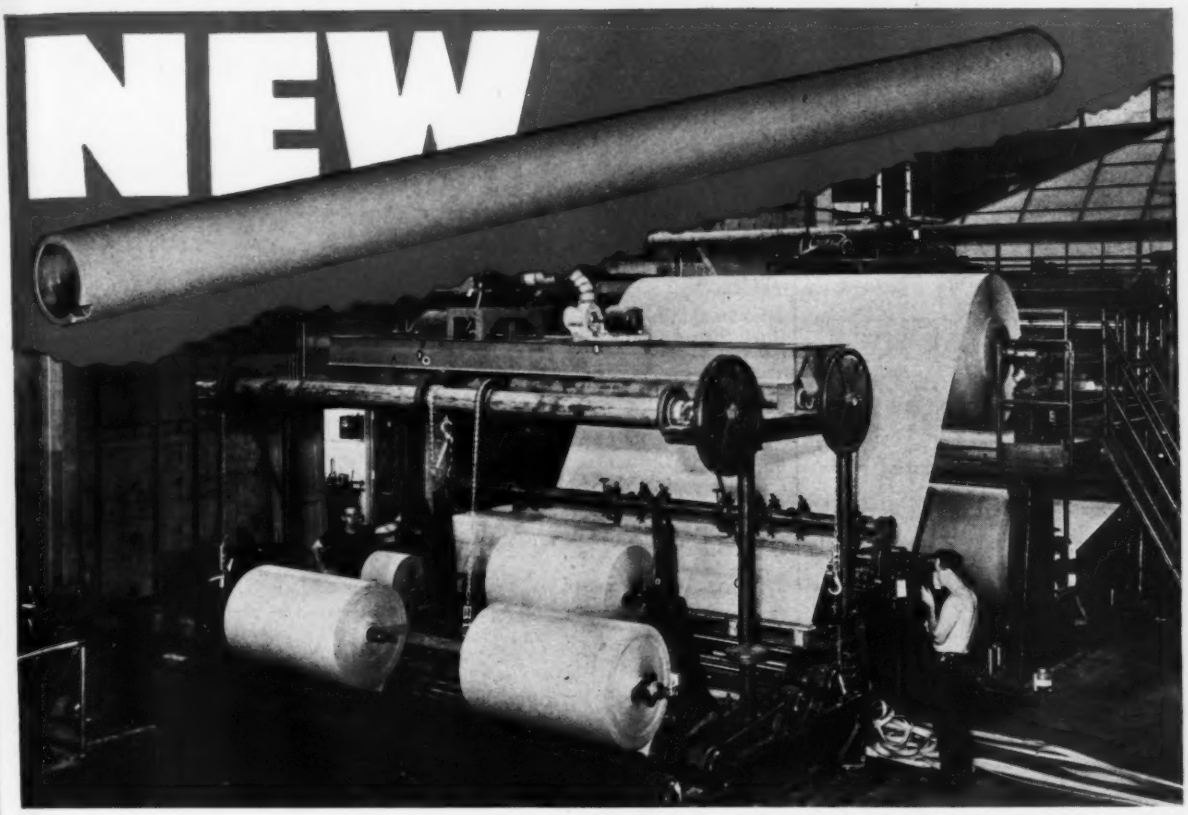

Photo courtesy Downingtown Manufacturing Company, Downingtown, Pennsylvania

Reynolds Rigid Aluminum Paper Core Stock means less waste, easier handling, lower shipping costs

IMPROVED performance plus important savings in shipping and handling—you get both with the new Reynolds Rigid Aluminum Paper Core.

This tough, heat-treated aluminum core is light, strong and durable. Ends are armed by steel inserts to prevent wear from driving members. Because the aluminum core can't rust, it will not stain paper. It feeds well because it runs true.

Heavy rolls of paper won't collapse Reynolds Rigid Aluminum Cores, causing costly shutdowns. There are no wasted ends—you can use all of the paper right down to the core.

This strong, lightweight aluminum core offers shipping economies, too . . . it can take bumps and rough handling in shipment without damage. One man can easily handle an empty core.

Find out how Reynolds Aluminum Paper Cores can bring you all these advantages. For complete details and engineering information, write to Industrial Machinery Division, Reynolds Metals Company, 310 Hanna Building, Cleveland 15, Ohio.

REYNOLDS METALS COMPANY, Aluminum Division, Louisville 1, Kentucky

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REYNOLDS' PIONEERING MADE ALUMINUM COMPETITIVE . . . TAKE ADVANTAGE OF IT!

35 paper machines installed!

That's experience!

Yes, EBASCO engineers offer you a total fund of experience gained from installing 35 paper machines over the past 20 years.

They also offer you the complete EBASCO facilities for designing, purchasing, construction and installation.

This kind of service will pay you well in speed and profits for your next job —whether you plan expansion, modernization or a complete new paper mill.

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Western N. Y. TAPPI Discusses Personnel

NIAGARA FALLS, N. Y.—The Western New York Group of the TAPPI Empire State Section met in the dining room of the International Paper Company on Friday, April 9th. A. H. Nadelman of the International Paper Company presided as chairman. About 160 attended.

The group was welcomed by H. P. Bailey, manager of the mill. R. G. Macdonald, secretary of TAPPI, outlined some of the current projects of the National Association, and G. H. Ireland, chairman of the CPPA, Niagara Branch, extended an invitation to those present to attend the next meeting of the Branch at Georgetown, Ont., on April 21st.

The principal speaker was Alexander G. Stone, general manager of the International Envelope Company, Dayton, Ohio. He was introduced by W. H. Monsson of the Hooker Electrochemical Company and chairman of the program committee.

Mr. Stone's subject was "Men and Management" and was a fine talk on human relations in the paper mill. He compared working conditions at the turn of the century with those prevailing at present.

He attributed much of the industry's progress to the part played by technical men since TAPPI was founded in 1915. A survey made by him of the employees in one mill that he managed indicated that 90 percent were average men, 7 percent were better than average men if properly placed, 2 percent were outstanding and but 1 percent were unfit. He felt that it is the responsibility of management to have this kind of information and to act for the well-being, health and happiness of the men under him and to make a fair and adequate study of selecting the best qualified men for promotion. In fact, it is his job to build men for advancement.

Mr. Monsson announced that the next meeting of the group will be held at the Prospect House in Niagara Falls, N. Y., on May 12th.

OBITUARY

George A. Ware

PLAINFIELD, N. J.—George A. Ware, noted for his accounting services to the newsprint industry, was buried from his home here on Wednesday, following his sudden death in New York on Sunday.

He had been identified with paper mill accounting problems for more than a score of years, coming to the News Print Service Bureau from the field of public accounting. He later left to establish his own consulting practice, and of recent years had combined that activity with special assignments for the News Print Bureau.

Kalamazoo Conducts Graphic Arts Panel

KALAMAZOO, Mich.—The Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry met at the Columbia Hotel on Thursday evening, April 1st. About 115 attended.

C. E. Munz of the Central Ohio Paper Company discussed "Paper Merchandising as Regards the Graphic Arts Industry." Cecil Jourdan of Evans-Winter-Webb discussed "Letterpress Printing," and Elmer F. Wagner of the Federal Lithograph Company discussed "Offset Printing."

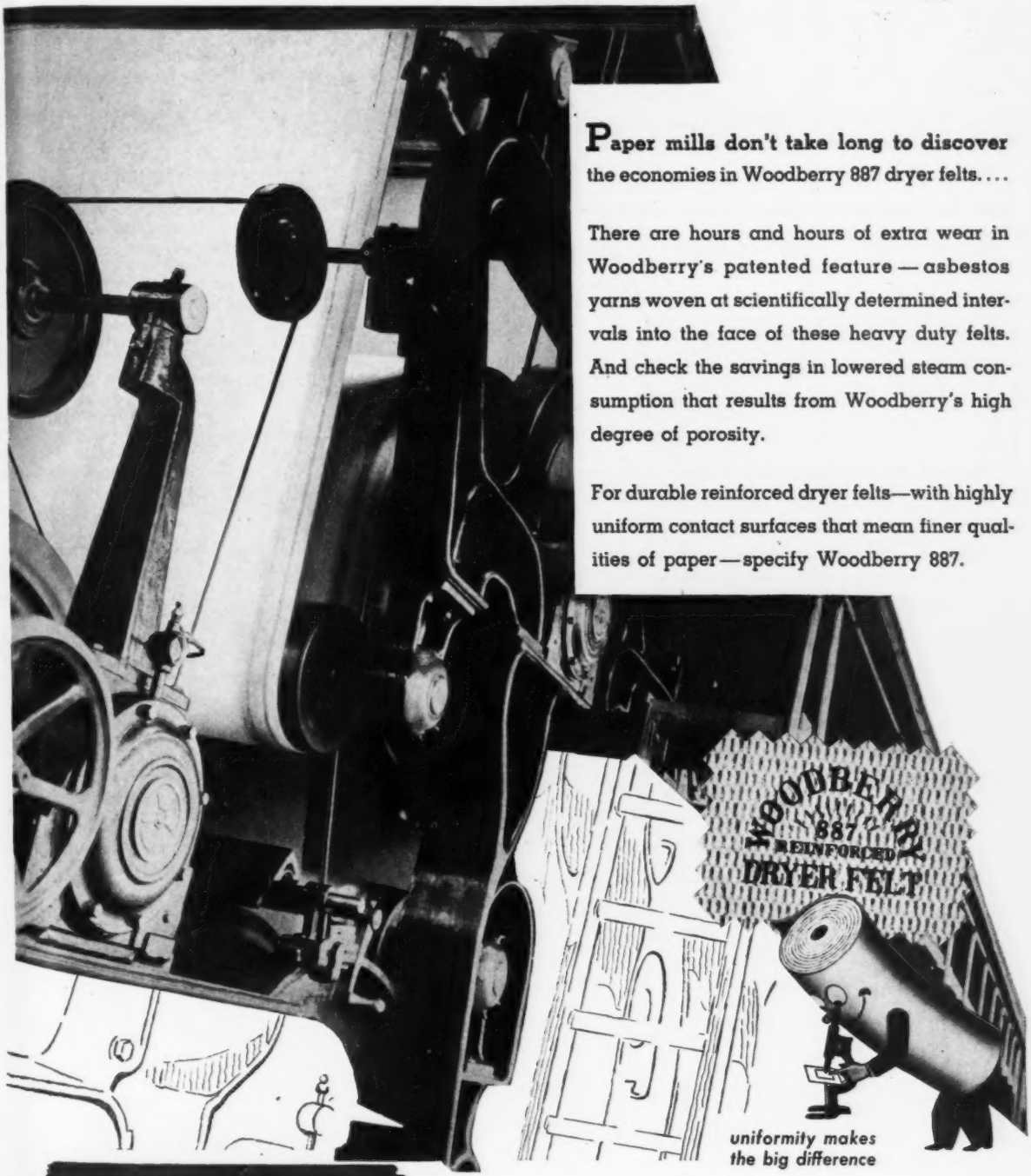
W. K. Kidder of the St. Regis Paper Company was program chairman. James A. Wise of the Kalamazoo Paper Company and Ralph Atkins of the Lee Paper Comany participated as panel members.

Mr. Munz commended the Technical Association for the very fine work that it has been doing, for a long time, through its meetings and publications in providing factual data for the benefit of the printing crafts.

Mr. Jourdan indicated that it is difficult to trace down causes of paper trouble in printing because printers are reluctant to report their problems, thinking that such action might reflect on their abilities as printers.

Those present included: F. Hamilton, W. Kirkpatrick, H. B. Johnston, C. Lillie, A. T. Luey, J. R. Willman, S. Sinclair, E. M. Deane, J. M. Gillespie, W. R. Tobin, G. Ritzema, C. F. Hoelderley, A. T. Fitzgerald, C. E. Munz, G. R. Marsh, A. C. Dreshfield, E. C. Wagner, K. D. Bacon, O. W. Callighan, R. H. Walsh, C. J. Jourdan, J. E. French, H. Nelson, D. Militzer, F. Elliot, R. Erickson, C. Fletcher, M. F. Galu, K. Latimer, R. Ludwig, C. Lovenheim, P. W. Bartholomew, G. D. Gerpheide, F. Hodgemire, C. C. Schneider, F. Chappell, J. Horacek, W. A. Lunsford, R. Mashburn, J. A. Stearin, J. W. Smith, F. Schucker, R. Trelfa, H. Ware, J. T. Marshall, L. Mimms, J. Wise, R. B. Caine, P. Carter, R. Clark, R. G. Bullard, V. G. Curry, R. Q. Horton, L. E. Haven, W. F. Hathaway, R. C. Germanson, J. H. Hayward, R. Hurst, A. Perlick, E. Minnard, M. Moffett, H. Smith, R. K. Smith, M. Rutz, J. Wood, R. Atkins, C. Beebe, C. Gardner, R. L. Barton, V. S. Burstein, D. Stocker, J. J. Harrison, R. B. Honeyman, R. M. Morden, R. Van Kirk, R. Tutt, C. R. Vander Muelen, F. R. Arthur, J. Green, G. D. Kaufman, H. Bradford, A. Cole, H. Nendorf, C. Bos, M. H. Dixon, L. Getmore, H. Foster, N. Klop, W. K. Kidder, M. J. Killian, K. Matreia, A. Mulder, J. H. McClure, L. E. Murray, L. Smith, H. E. Sweetland, H. L. Bills, S. Irwine, N. G. Jean, E. P. Lovenheim, G. Davison, E. B. Taylor, D. Bachelder, H. Heenan, M. Fogerty, H. Merkle, A. Sherwood, H. S. Faram, D. H. Merrill, D. Sisson, E. B. Spreen, L. J. Scheid.

Savings Will Be Felt...
when you use Woodberry 887 Dryer Felts



Paper mills don't take long to discover the economies in Woodberry 887 dryer felts....

There are hours and hours of extra wear in Woodberry's patented feature — asbestos yarns woven at scientifically determined intervals into the face of these heavy duty felts. And check the savings in lowered steam consumption that results from Woodberry's high degree of porosity.

For durable reinforced dryer felts—with highly uniform contact surfaces that mean finer qualities of paper — specify Woodberry 887.

uniformity makes the big difference

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Bagley-Sewall Plans Its Own Power Plant

WATERTOWN, N. Y.—Construction of a hydro-electric unit, designed to make the Bagley & Sewall Company electrically self-sufficient, will be started as soon as the Black river water level drops for the summer months, according to Abe Cooper, president of the company.

The new plant, expected to cost $40,000, will use water power for generating electrical energy from the old International Paper Company dam on the north channel of the river.

Mr. Cooper said the new unit, when placed in operation, will supply continuous 800 horsepower, or 700 kilowatts. He said the new supplement to the company's power resources will provide more than enough electricity to meet the needs of th industrial plant. The company now buys considerable electricity from the Central New York Power Corporation.

Mr. Cooper said the electricity generated beyond what is necessary to meet plant needs will likely be used in core drying.

Most of the retaining wall for the hydro-electric plant was built last fall. It will be completed along with the rest of the structure this summer.

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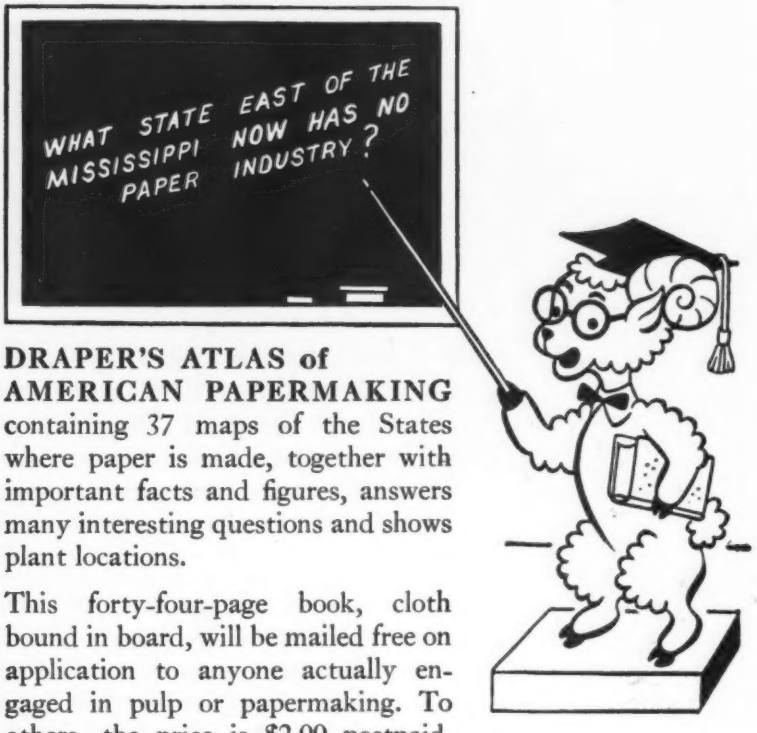

DRAPER'S ATLAS of AMERICAN PAPERMAKING containing 37 maps of the States where paper is made, together with important facts and figures, answers many interesting questions and shows plant locations.

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Answer to Question No. 4 — The State of Kentucky

Solvay Invests In Wyandotte Growth

WYANDOTTE, Mich. — Increase in Wyandotte Chemicals Corporation's capital funds through sale of a minority holding in Wyandotte stock to the Solvay American Corporation, American affiliate of Solvay et Cie. of Brussels, represents no relationship between the two companies other than one of an investment nature, E. M. Ford, president of Wyandotte, emphasized last week.

Under a plan approved at a meeting of Wyandotte stockholders here, the Solvay American Corporation will make an initial investment of $12,750,000 in new Wyandotte stock. Subsequent stock purchases by Solvay will bring its total investment in Wyandotte to approximately $18 million.

"Control of Wyandotte will remain in the hands of the present owners," Mr. Ford said. "The Solvay American relationship with the Wyandotte Chemicals Corporation will be of an investment nature. I want to stress as strongly as I can that there will be no sales agreements, division of sales territory or mapping out of markets. No such relationship is contemplated now, or at any time."

"Our reason for engaging in the transaction is solely to acquire additional capital funds to help finance our $25 million expansion program and to provide more working capital for other growth requirements of the company," he explained. "The stockholders considered several methods of increasing capital funds, and selected the Solvay American offer to purchase stock as the one most advantageous to the company."

It is understood that the Solvay interests have already disposed of a part of their Allied Chemical & Dye Corporation holdings, and that the remaining shares will be put into a voting trust. As a result, Solvay will have no voting interest or representation in Allied Chemical & Dye.

Gibson Protests Forestry Plan

VANCOUVER, B. C.—W. Clarke Gibson, member of the firm of Gibson Brothers, logging operators on the west coast of Vancouver Island, with headquarters at Vancouver, B. C., speaking for independent logging interests and truck loggers, told the Forestry Committee of the B. C. Legislature that while all logging operators in British Columbia were anxious to see sustained yield forestry put into effect in B. C. that he and the loggers he represented were certainly not in accord with the method which had been adopted. Mr. Gibson attacked the forestry license management plan developed by the government last year to maintain a sustained yield forestry plan in B. C.

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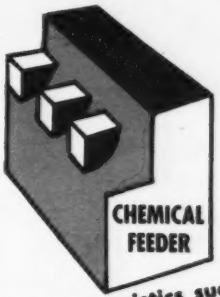

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MacMillan Interests Investigate Nanaimo

VANCOUVER, B. C.—While official confirmation is lacking it is reported that the new $12 million pulp mill, projected by H. R. MacMillan interests in British Columbia, may be built on the Southern side of the harbor at Nanaimo, B. C.

This was indicated following several weeks of inquiry and testing by surveyors and engineers who have been tracking down possibilities of water supply and other factors relating to successful location of a mill of this kind.

A dam is planned by the company to raise the level of Nanaimo lake about 30 feet to provide storage for water for the dry season.

This will ensure a constant supply at all times. This is an important consideration because the east coast of Vancouver Island enjoys a rather light rainfall and some streams are low in July and August.

E. B. Ballentine, vice-president of H. R. MacMillan Export Co. Ltd., said: "While we have investigated the Nanaimo area along with several others as a possible location for our sulphate mill, we have not been able to reach a final decision on the subject, and will not be able to do so for at least four weeks."

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DOMESTIC AND EXPORT

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Canadian Sumner Gets Tasmania Contract

VANCOUVER, B. C.—Canadian Sumner Iron Works Ltd., has received contract for construction of sawmill and pulp-mill machinery for a large Australian paper concern at Tasmania. Sumner, which in recent years has specialized in constructing mill machinery, will build hydraulic barking machines and other equipment for the Associated Pulp & Paper Mills Proprietary Limited.

The company, which uses eucalyptus timber for manufacture of fine writing and printing papers, has experimented in removing the bark from these trees with the Bellingham type of hydraulic log barker. It proved successful, and the machine was ordered from Sumner.

Accompanied by Ray. F. Turnbull, principal research officer-in-charge of the utilization section, Australian government division of forest products, he made a tour of U. S. and Canadian mills.

Later they were joined by Harold F. Shiriffs, deputy general superintendent of Associated, Robert H. Hurle, chief engineer, and the Sumner machinery was chosen.

In addition to the hydraulic barker, other machinery from the Sumner shops will include log hauls and log deck machinery, log turners, log loaders, two eight-foot bandmills, two air-operated sawmill carriages with shot gun feeds, one slabgage chipper, one whole log chipper, and incidental machinery.

Machinery will be supplied to Paper Makers Proprietary Ltd., a subsidiary of the associated organization, and shipped to their operations at Burnie, in northwest Tasmania on Emu Bay.

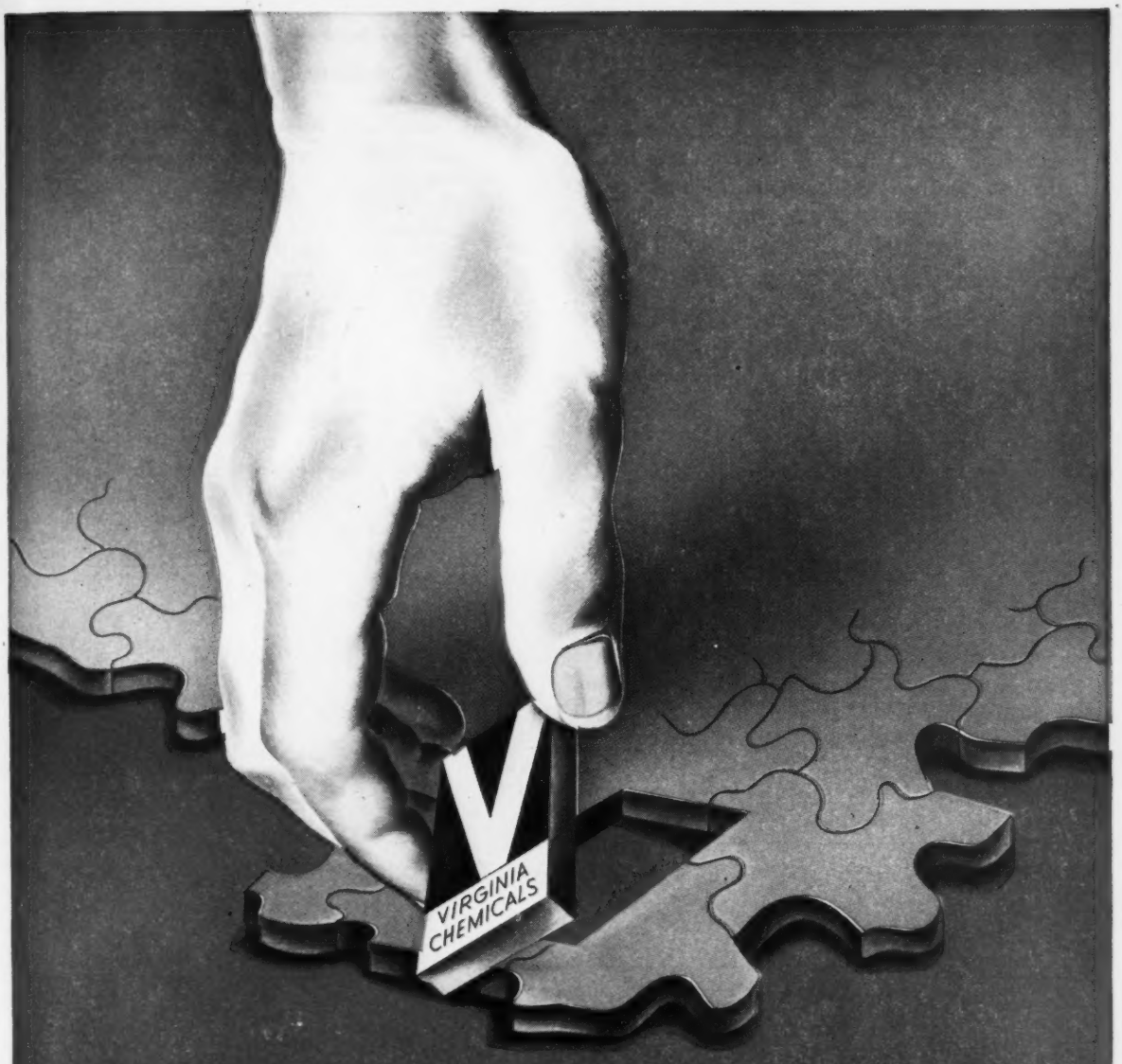
TRENDS

(Continued from page 30)

ity for the week ended April 3 retrograded to 143.6 from 146.3 in the preceding week, compared with 142.2 in the corresponding week of 1947. Index of paperboard production was 184.6 percent compared with 191.0 in the preceding week and with 179.3 in the corresponding week of 1947.

Paper production for the week ended April 3 was estimated at 101.9 percent compared with 98.2 (revised) for the preceding week, with 106.1 for the corresponding week of 1947, with 104.1 for 1946, and with 86.8 for the corresponding week of 1945. Tonnage production was 8.8 percent greater than last year's although because of a 13.3 percent increase in 1948 capacity this year's production ratio is lower.

Paperboard production for the week ended April 3 was 98.0 percent of capacity, compared with 104.0 for the preceding week, with 102.0 for the corresponding week of 1947, with 99.0 for 1946, and with 92.0 for the corresponding week of 1945.



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It is apparent, therefore, that if the industry were to operate at the same ratio to capacity as in 1947, it can produce in the neighborhood of 23 million tons of paper and paperboard this year. Overall pulpwood receipts in 1947 were close to 20 million cords—enough to make 13 million tons of pulp. In the light of high inventories at the year end and barring only weather interferences, I think the industry can well be expected to secure adequate pulpwood to meet demands. If pulp imports again reach over 2 million tons, we could allow 700,000 tons for dissolving and other non-paper uses, and there still would be over 14.5 million tons for paper making and this would support production of 23 million tons. So there is ample reason to believe that 23 million tons of paper and paperboard can be made in 1948; and that with newsprint and other paper imports, the new supply, if required by demand, could reach the amazing total of 27 to 27.5 million tons or sufficient for an apparent per capita consumption of about 370 pounds.—COLA G. PARKER, in an address before the National Paper Trade Association.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1948		Corresponding Weeks—1947	
February 28	102.1	March 1	108.5
March 6	99.9	March 8	104.5
March 13	100.9	March 15	107.2
March 20	101.2	March 22	105.8
March 27 (Revised)	98.2	March 29	107.8
April 3	*101.9*	April 5	106.1

COMPARATIVE MONTHLY SUMMARIES

1947						1948	
Jan.	102.1	May	106.2	Oct.	109.5		
Feb.	105.9	June	106.0	Nov.	109.3	Jan.	100.9
Mar.	106.1	July	93.5	Dec.	101.5	Feb.	100.3
Apr.	105.1	Aug.	104.2			Mar.	*100.3*
		Sept.	102.0	Year Avg.	104.3		

COMPARATIVE YEARLY SUMMARIES

	1941	1942	1943	1944	1945	1946	1947	1948
Year to Date	89.6	103.3	88.7	88.3	88.3	99.1	105.1	*100.5*
Year Average	97.4	90.4	87.8	88.1	89.4	101.1	104.3	

NOTE: *As of January 10 capacity base increased by 13.3%*

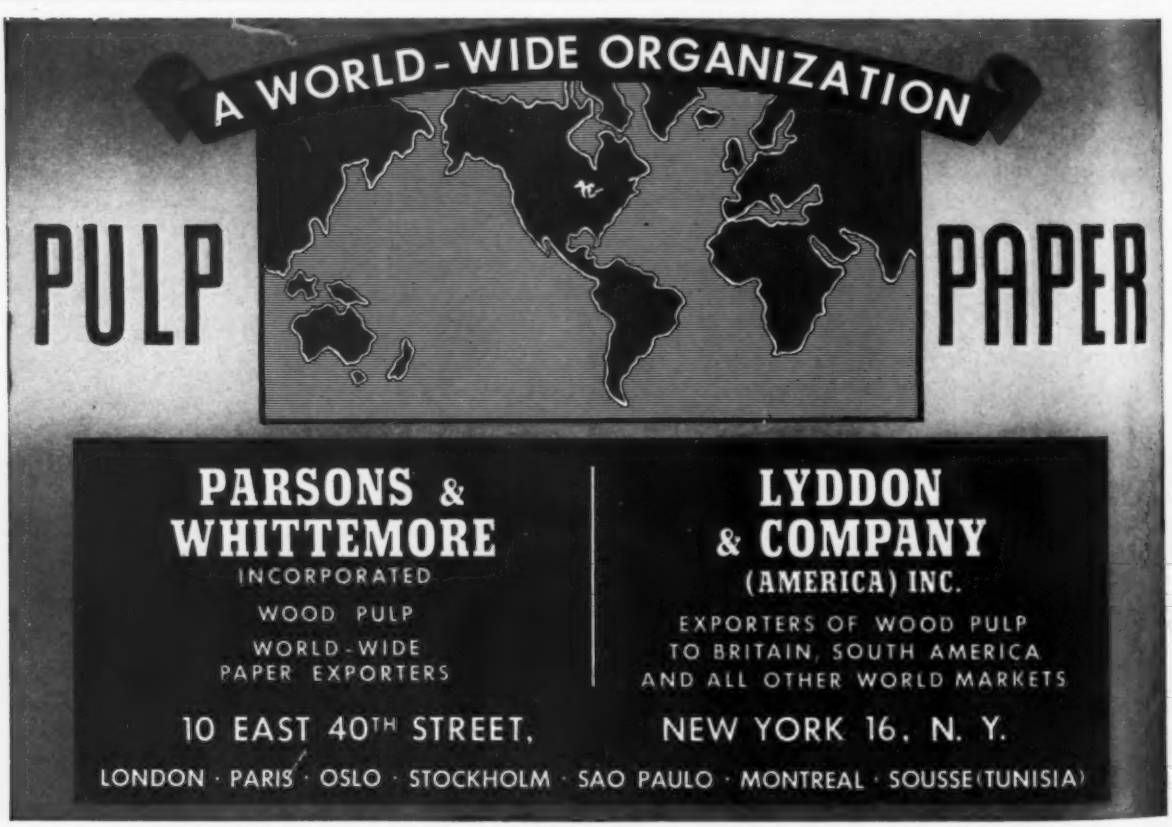
PAPERBOARD OPERATING RATIOS†

Current Weeks—1948		Corresponding Weeks—1947	
February 28	101	March 1	102
March 6	104	March 8	102
March 13	102	March 15	104
March 20	104	March 22	103
March 27	104	March 29	102
April 3	*98*	April 5	102

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1947	99	103	101	100	101	101	90	99	96	101	99	89	98
1948	99	100.	*102*										

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.



EDITORIAL

Cost of Venture

To the high cost of equipment replacement in a period when costs have got well beyond the limits contemplated when replacement budgets were first set up, it appears that management has an added headache in that any funds which it might deem wise to spend are proving difficult to draw from their anchorage for a cruise on the seas of capital risk. This, in the face of the fact that population is growing at an accelerated rate and living standards are improving at a pace that would appear to make investment in the future of this country a soundly conseravtive venture.

A recent bulletin of the Guaranty Trust Company of New York declares that in no year since 1935 has as much as 12 per cent of total corporate expenditure for new plant been financed by stock issues. The proportion of funds so raised for such a purpose is less than 6.2 per cent for the entire period 1936-1947. As against this, the National Association of Manufacturers estimates a current deficiency of $8 billion annually, and it points out that commercial bank loans rose rapidly in the same twelve-year period. There would seem to be no disagreement, it observes, as to the existence of a large shortage of venture capital.

"It is generally agreed," says the bank's comment, "that the country now faces a period of large and sustained demand for new capital to supply the needs of a growing population, replace worn-out and obsolete plant and equipment, and give effect to technological improvements. These needs must be filled at a time when prices and costs will, in all probability, be considerably higher than they were before the war. The inactive capital demand that has long served to conceal the limitations on the supply of venture capital seems to be giving way to a radically altered situation, in which the problem of venture capital must be frankly faced and constructively dealt with if our economy is to expand and thrive.

"The situation appears to be attributable to numerous causes. One of these is the heavy tax burden that has been laid on individual incomes, especially those in the higher brackets, which, it is generally agreed, are the principal source of the savings that normally supply the great bulk of venture capital. The almost confiscatory rates on large incomes leave relatively little surplus for investment in equity securities and little incentive to assume the risk that such investment necessarily involves. The situation is aggravated by the estate taxes, which further weaken the incentive to risk-taking investment and which depress the market for equity securities both by forcing hasty liquidation and by breaking up large estates into smaller units for which such securities represent a less suitable form of investment. The double taxation of dividends is without theoretical justification and is certainly harmful in its practical effects. Although the law makes a distinction in favor of income derived from captial gains, this partial exemption appears insufficient to induce an adequate amount of risk-taking investment.

"The long-term outlook for business concerns has been weakened by tax laws and by high and inflexible costs. Tax rates on corporations represent a strong deterrent to expansion, especially that of the more venturesome sort. Changes in the price structure have been such as to narrow the margin between raw-material costs and selling prices. Wage costs have risen sharply and have become more inflexible, creating a situation that is not a serious handicap to most divisions of industry as long as production, employment and prices remain at high levels but that could become a heavy burden in the event of a general decline in the volume of activity and the price level. The rising 'break-even' point for industry—that is, the level of activity that marks the dividing line between profit and loss—has become an object of increasing concern.

"The hesitancy of investors to supply equity capital is probably due in no small measure to the attitude of disapproval and distrust toward profits in general which has given rise to persistent pressure on industrial concerns to keep prices down in the face of rising costs, and which was manifested recently in the official investigation of the rise in prices of certain steel products. Some of the early postwar views concerning relationships between prices and costs have been rather thoroughly discredited by events, but it seems that the essential role of profits in a free-enterprise system has not yet gained full recognition.

"International affairs also have played an important part in creating the present situation in the market for venture capital. The unsatisfactory state of international relations is necessarily a major unsettling factor in the domestic business outlook; and the urgent need for American goods and American dollars abroad has resulted in the liquidation of some domestic securities owned by foreigners, with a depressing effect on the market.

"In the long run, an inadequate supply of equity capital must inhibit industrial expansion, limit employment opportunities, and weaken the financial position of business concerns and their ability to weather the varying economic climate that the passage of time will inevitably bring."

W. L. Cook

Editor

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Bulking Book	Tissue
Carbon	Boxboard
Catalogue	Bristol Board
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Mimeograph	News Liner
Offset	Newsprint
Rag Bond	Insulating Lumber
Sulphite Bond	Wall Board

Solid Manila Board
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Molded Plates and Cartons
Rag and Saturating Felts

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In processing, Celite helps control pitch—it recovers scrap—improves formation—speeds draining—reduces drying load—increases production and improves retention. Celite gives the final product increased bulk—higher brightness—better opacity—greater absorption—improved ink receptivity—greater smoothness and less gloss.

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Screen Residue, Percent Retained on 325 Mesh (Max.)	1.0	8.0	3.0	15.0
Particle Size (Sedimentation Method) Predominant Range (Microns)	4-0	8-1	10-2	20-4
Absorption *(Water)	210	215	160	195
*(Linseed Oil)	185	205	140	170
True Specific Gravity	2.00	2.00	2.30	2.30
Percent Moisture (Maximum)	6	6	1	1

*lb. of liquid per 100 lb. of Celite (Gardner-Coleman)

APPEARANCE . . . Uniform, fluffy powder

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SUSPENSION . . . Excellent

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Wood-Fiber Production with Revolving Disk Mills

By Clinton K. Textor

The principles, design and operation of revolving disk mills is described. The science of fiberizing wood is undeveloped and the election of equipment and procedures is dependent upon experience and specific experiment. Wood is frequently steamed or cooked before fiberizing; procedures and equipment for such pretreatment are described. The use of disk mills in the manufacture of wall board, saturating felt, container board and paper is outlined.

Introduction

In the course of the development of the pulp and paper industry, a great many machines or "engines" have been proposed and used for producing masses of fiber direct from wod. Similarly, many types of mills have been used for the further mechanical treatment of the pulp so produced, or to treat pulps manufactured by the chemical cooking of wood, in order to improve the sheet-making properties of the fiber and to develop strength and other desirable qualities. Of the many devices tried, only three have had sufficiently wide acceptance to be considered traditional equipment of the industry. These are the grindstone for producing "groundwood" or "mechanical pulp" by the direct grinding of logs or sticks of wood, and two rotating bar mills, the hollander beater and the jordan engine, used to "prepare", "beat", or "refine" pulps for the actual paper-making operations.

Revolving disk mills in various forms, as for example, the burr stone mill, have long been used for reducing wood to pulp, wood flour, and a variety of intermediate products, especially for paper and board, but they never achieved wide popularity. The more modern form of disk mill or refiner entered the paper industry about 25 years ago and is being used increasingly for a multiplicity of purposes, such as for the production of pulp for paper, fiber board, and wallboard from raw or pre-treated wood chips, for the development of strength and other properties of pulp for paper making, and for the repulping of waste paper. These several uses seem to be unrelated but are all merely logical applications of the same fiberizing effect of disk-mill treatment.

Design and Operation of Disk Mills

The general design of modern disk mills is illustrated in the accompanying illustrations. Figure 1 illustrates a "single disk" mill. Chips or other fibrous materials are fed in at the center of the mill and fiberizing is effected as the materials pass outwardly between a revolving disk and a stationary plate; for purposes of construction, the stationary plate may comprise part of the case, or it may be held by a non-rotating disk.

In the "double disk" machine both disks revolve, but in opposite directions. In the machine shown in the illustration (Figure 2), the raw material is fed

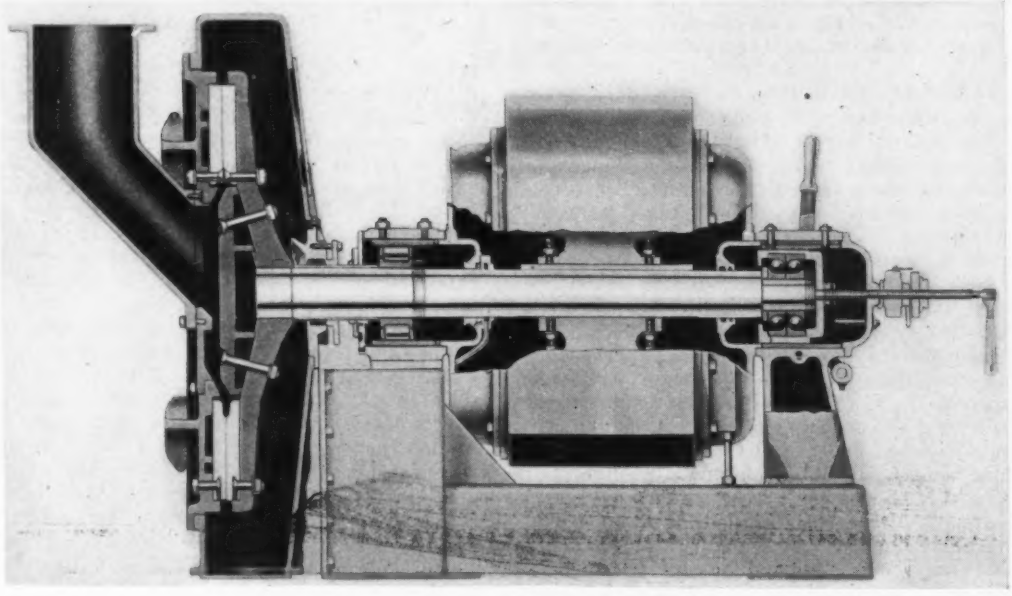


FIG. 1
Single revolving disk mill.

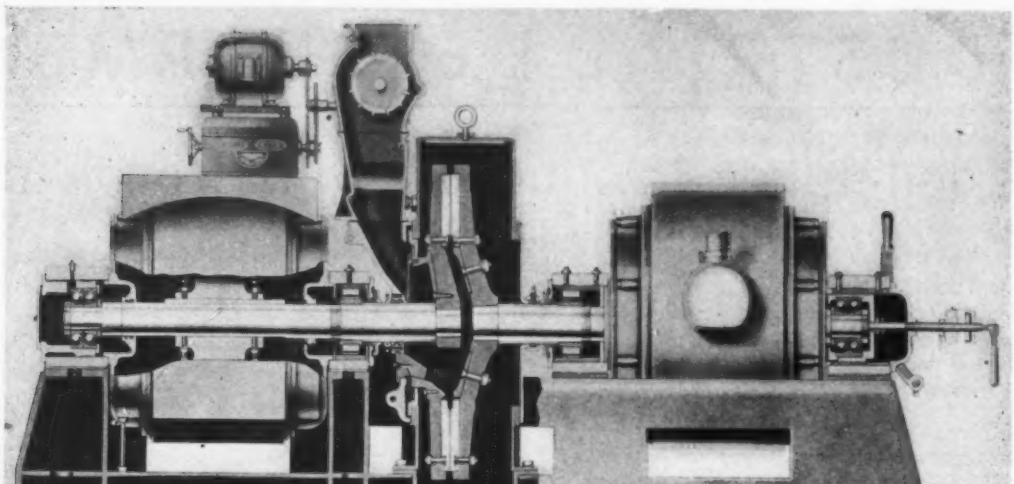


FIG. 2
Double revolving disk mill with feed regulator for chips.

into the fiberizing zone of the mill through the spokes of one of the rotating disks. However, the feeding may be effected through a hollow shaft, and this type of construction can also be used in the above-described single-disk mill, which is equipped with one rotating and one stationary disk.

Experience has shown that there are real differences in the performance of a single-disk machine, as compared with a mill in which both disks revolve. That there may be difference in performance can be anticipated by a consideration of the action of the two types of mills. A ball in contact with both plates of a single-disk unit will be set in motion by the revolving disk, will roll on the stationary plate, and will travel in a spiral path from the center to the periphery. It will be subject to two centrifugal forces; the rapid rolling will tend to "explode" the ball, while the spiral travel will work to accelerate discharge of the ball from the machine.

On the other hand, a ball similarly placed between the plates of a double-revolving disk unit, will receive the same but opposite impetus from each plate; it will roll rapidly but will not travel outwardly as long as it is in contact with both plates, except for other forces such as gravity, or the feeding of additional material. The only centrifugal force acting on a ball under such conditions is that tending to explode it.

While there are basic differences in the actions of the two types of disk mills, there are no scientific data for choosing the type better adapted for a specific job. Such a choice will have to depend upon experience in commercial operations, or upon tests made with full-size equipment. In both classes of disk mills, there is a considerable spread in the speed of rotation employed in individual unit. Both the productions by the machine and the quality of product is influenced by speed, which should be selected accordingly.

Actual designs of various makes of disk mills may depart radically from those illustrated in Figures 1 and 2. The shaft may be vertical and time of retention of material between the disks may be regulated by pressure devices. But all disk mills incorporate the simple basic ideas above pictured.

A special type of disk mill, in which fiberizing may be conducted at temperatures and pressures well above 212° F. and zero gage pressure, produces a unique type of fiber. However, the design and application of this type of fiberizer is properly the subject of another paper.

Usually the disk and the stationary "heads" are provided with renewable "plates," which do the actual refining job and which may be replaced when worn. These plates are designed for a variety of applications and involve an endless variation of groove and tooth pattern and dimension. Plates are sometimes available in the form of full circles, but generally they are produced in segments constituting one-third or one-sixth of a circle. A few representative patterns of the many which are in current use are illustrated in Figure 3.

As in the case of hollander beaters and jordan engines and other devices used to develop the potential properties of fiber, our basic knowledge of fiber and of the effect of mechanical treatment upon it is inadequate to explain or predict the performance of a disk machine upon a new raw material. Our knowledge of the theory in this field is too limited to serve as a base for te design of disk machines and their fiberizing plates. The information we have concerning the functioning of this type of machine is largely factual and descriptive and based either upon actual commercial experience or upon experimental investigation of means to achieve a specified fiber quality. And there is a considerable number of variables involved which have bearing upon the performance of the machine and upon the quality of product achieved. Unfortunately, these variables are of a nature which prohibits the use of miniature equipment for investigative purposes; this situation is similar to that which obtains in connection with investigations of beating and jordanning.

While the several variables are known and recognized, their individual influence and range is only sketchily understood and the correlation between them is still largely a matter of cut and try. Among the variables are such factors as (1) speed of rotation, (2) peripheral speed, (3) rate of feed, (4) relation of water to dry fiber (consistence), (5) pattern of

INDUSTRIAL DEVELOPMENT

Paper Trade Journal, in this new section, proposes to make space available for discussion of administration and operational problems of the pulp and paper industry, as well as for the presentation of independent studies and research on technical and engineering subjects. Noteworthy features of paper mills, converting plants, associated industries and institutions also will be presented, as they become available. These pages will be open to all who are qualified to discuss subjects within these limits. Manuscripts, submitted for approval, will be welcomed.—E. P. McGINN, Industrial Editor.

fiberizing plates, (6) temperature of feed, (7) rate of power application, (8) distance between the plates, and (9) precision of construction.

No attempt will be made in this paper to provide an adequate explanation of what happens to materials, such as wood chips, in passing through a revolving disk machine. It is obvious that liquids passing through the unit will be violently agitated, and that solids large enough to have simultaneous contact with both plates will have a tendency to roll. Whatever the final explanation may be, experience has shown that disk machines are effective in producing masses of individual fibers (or small fiber bundles if desired) from fibrous aggregates, such as wood chips, old paper, straw and other materials. It has further been shown that such fiberizing is accomplished with substantially less shortening of ultimate fiber, as compared with a job performed with traditional equipment which involves the cutting action of "bars" or "knives" in beaters and jordans, or the abrading action of the "groundwood" pulping stones. Generally a single pass through a disk mill serves the purpose, but as many as four or five passes are used for specific objectives.

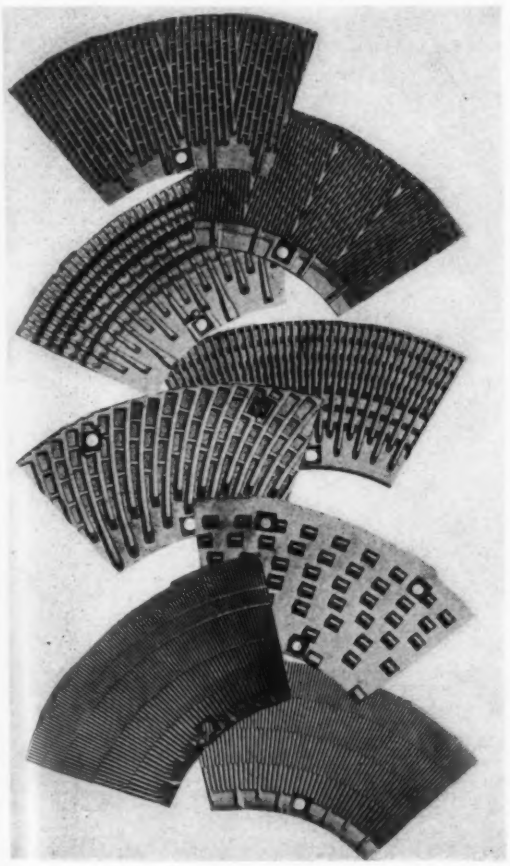


FIG. 3
A few patterns of fiberizing plates.

While there are inadequate data concerning the effects of the many variables previously indicated, to permit, without trial, a specification of speed, plate design, and power required to produce fiber of a definite quality from wood chips, there is however a mass of data from commercial operations and from laboratory investigations on which a fair idea of the fiberizing requirements can be predicated.

Fiberizing of Wood Chips

Wood is the raw material on which the following comments are based, although many of the findings apply equally well to other fibrous materials. And for the most partt he comments apply to wood which is available in pieces large enough to produce chips of the general size and character of those conventionally used in the chemical pulp mills. Such chips can be taken as measuring one-half inch to one inch with the grain by one-eighth inch thick by one-half inch to one inch wide. (Brief mention of the use of bark, and smaller particles of wood, such as sawdust and shavings, will be made later in the paper). As in the case of chemical pulp, the best end products are made with uniform chips, which are best prepared from logs or cordwood sticks. But in many of the fiberized products produced from wood by means of revolving disk mills, the quality specifications are not too exacting and for most purposes sufficiently good chips can be made from many kinds of wood waste, such as slabs and edgings, logging waste, veneer cores and scrap, waste from box factories and furniture factories, and the extracted chips from the tanning and naval stores industries. Both the "hardwoods" from deciduous trees and the "softwoods" from the coniferous species are being fiberized effectively in commercial installations.

Wood in the form of chips and without any preliminary treatment can be fed to a disk mill to produce a variety of products, depending upon the moisture content of the wood, the species, and the method of milling. A considerable proportion of the wood flour made today is produced by fiberizing dry wood (10 percent moisture content) with disk mills. With a different type of plate, a mass of "match sticks" can be produced; this type of material is suited for further processing and at present has merit chiefly in that it produces a reasonably uniform size mass of match sticks from non-uniform wastes, such as hogged sawmill refuse.

Green or water-soaked chips fed to the disk mill with water wil be discharged as a pulp somewhat similar in character to groundwood pulp; the power consumption is roughly equal to that required by the conventional grind-stones in producing mechanical pulp of like quality. Considerable quantities of certain species are currently being fiberized, in green condition, for the manufacture of insulating board and hardboard.

There are no commercial installations of the use of disk mills in producing "groundwood" pulp for the

manufacture of newsprint paper, the nearest application being the use of revolving disk mills for the refining of groundwood screenings. However, this application may have merit, due to the fact that chips may be made from small or irregular sticks of wood which are unsuited to the conventional grinding procedures.

Cooking of Wood Before Fiberizing

Although a preliminary soaking, steaming, or cooking of the wood is an integral part of many of the applications to be described, all discussion of the traditional "full cooking" processes of the chemical pulping industry is omitted from this discussion. Such processes are completely described in the voluminous literature of that established industry.

These preliminary treatments of the wood will be considered in three groups, with (1) water at atmospheric temperatures and pressures, (2) water at elevated temperatures and pressures, and (3) water and chemicals at elevated temperatures and pressures.

The first group includes the steaming of the chips at atmospheric pressures, as well as the soaking or boiling of the wood in hot water. Such a treatment at atmospheric pressure has the effect of softening the chips somewhat and enables the disk mill to produce a pulp with fewer broken fibers and of a more pliable character, which "felts" together better into a stronger sheet of paper or board. In general this must be considered as a mild treatment, which will produce a modest increase in strength and quality, although often these modest increases are entirely adequate for the purpose. The degree of softening of the chip depends upon the species of wood involved, and upon the time and temperature of the soaking or boiling. There is generally a slight darkening of the wood incident to this treatment, which, in addition to improving the fiber quality, sometimes has the effect of lowering the power required in the fiberizing in other cases, the soaking has the result of toughening the chip and increasing the power usage.

The second group of pretreatments is practiced in two modifications, differing only in the proportion of water to dry chips involved. When only one to one and one-half pounds of water accompany each pound of oven-dry chips, the operation is generally referred to as "steaming". On the other hand, when there is free water present in addition to that absorbed by the wood itself, i.e., when each pound of dry chips is accompanied by three or more pounds of water, the operation is generaly referred to as "water cooking." There is not a great deal of difference between the two types of operation; water cooking generally produces a somewhat better quality of fiber but involves a higher steam consumption, as compared with the steaming operation.

In actual applications, the conditions of cooking or steaming vary enormously, both as regards time and pressure involved and with reference to the quality of fiber produced. For producing various fiber qualities in commercial operations, this preliminary teratment will vary from a few minutes steaming at 300 psi. in one plant, to another in which the wood is steamed for 120 minutes at 30 psi. Very usable fiber is prepared from chips steamed for 15 minutes at about 100 psi.

The steaming or water cooking of wood chips has a profound effect on the quality of the wood, and long steaming can seriously reduce the yield and impair the strength of the fiber. Time and pressure should be chosen with reference to the fibrous product desired and to the species of wood involved. Different species have shown big differences in behavior when steamed; the bond in the wood from deciduous trees yields much more readily to this type of operation than does that in the wood from coniferous species.

The steaming operation induces a series of changes in composition and property of the woods. Some of these changes are permanent and some are reversible. The change in color, for example, is permanent, whereas the softening of the wood is in part reversible. Steaming softens the wood, but when the steamed wood becomes cool, it regains about one-half of its original hardness in the course of a few minutes. Thus wood that has been steamed can be fiberized at atmospheric pressure with much less power than was needed for the raw wood, and the fiberized product is much stronger and more pliable. The more pliable the fiber, the lower its resilience and the greater is its tendency to retain its compacted volume after a wet pad or sheet of it has been subjected to pressure. Sometimes these properties are highly desirable, but at other times they are completely objectionable, and the pretreatment must be chosen with regard to the several qualities of fiber.

The plastic properties of wood are definitely influenced by a steaming treatment. When the proper time and temperature of steaming has been established for a particular species of wood, a fiberized product can be prepared which, after hot pressing, has much improved water resistance.

The third group of preliminary end treatments includes the many semi-chemical pulping processes. Strictly speaking, the scope of semi-chemical cooking comprises the entire field between "full chemical" cooking and no cooking at all. An almost endless number of semi-chemical processes results from various combinations of time of cooking, steam pressure, and the kind, quantity and concentration of chemicals used.

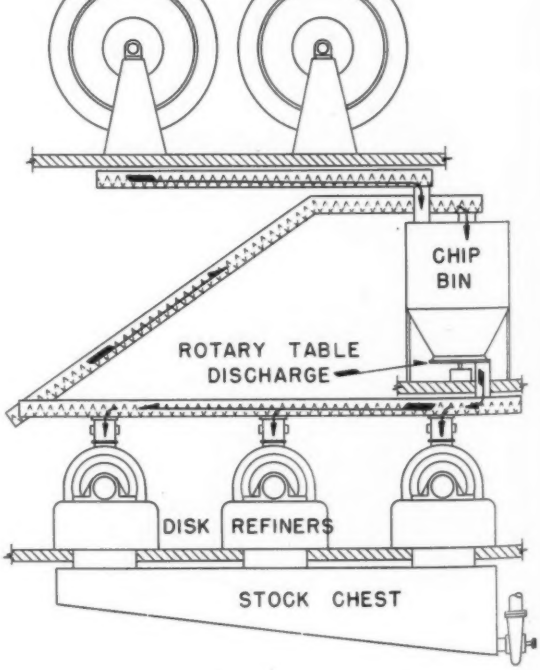


FIG. 4
Flow sheet of a system for pretreating and fiberizing wood chips.

In actual practice, the semi-chemical processes are generally thought of as those in which a yield of 65 to 90 pounds of dry pulp is produced per 100 pounds of dry wood, and in which the chemical charge is from one-fifth to one-half that used in the "full cooking" operations. But there are a few plants in commercial operation whose wood treating operations must properly be called semi-chemical in which the charge is approximately one-tenth of that used for full cooking operations.

Probably the best known semi-chemical process is that frequently used in the investigations of the U. S. Forest Products Laboratory. In this modification the chemicals used comprise a mixture of about 80 percent sodium sulphite and 20 percent sodium carbonate. Many of the commercial semi-chemical operations use that particular procedure. But other semi-chemical mills are operating successfully and using caustic soda, sodium carbonate, sodium sulfide, and lime, either alone or in mixtures.

The selection of a semi-chemical cooking procedure should be made with respect to the species of wood involved, and the quality of fiber required for the particular end product. In actual commercial installations, the processes used have been thus selected. One may be little more than a water cook, modified by the addition of as little as ten percent of the chemicals ordinarily used for full cooking procedures. Another uses up to one-half of the normal cooking charge to produce a high yield pulp that can be bleached and used in the manufacture of fine papers.

All of these semi-chemically cooked chips require fiberizing of some sort before they can be used effectively in an end product, and so the semi-chemical pulp mills almost without exception employ revolving disk mills. Depending upon the degree of cooking and upon the quality of fiber required, the power required in fiberizing varies all the way from 30 horsepower per ton per day down to as little as five.

Equipment for Cooking Wood

There is no standard procedure and no standard equipment for conducting these preliminary treating processes. Most frequently seen in actual operations is a train of equipment generally outlined in Figure 4. This system comprises a globe rotary digester whose contents, after cooking, are dumped directly into a "hot chip" bin or on a conveyor which in turn delivers to the bin. Preferably, this bin is equipped with a turntable bottom or other means by which the chips may be discharged at a uniform rate. Then, by means of a suitable conveyor, the cooked chips are conducted to the feed regulators of one or more revolving disk fiberizing units, the surplus being returned to the hot chip bin. The chip feed regulators provide an accurate means of controlling the flow to the individual revolving disk mills. Usually a single pass through these mills is adequate to prepare a fiber for conversion into the desired end product. Frequently it is advisable to accomplish 90 to 95 percent of the fiberizing action in a single pass, screen off the over-sized particles with suitable equipment, and return the rejects for a second pass through the disk mills. Many of the preliminary treatments generate substantial quantities of wood acids and in such cases it is advisable to use digesters lined with brick or acid resistant metal, and in general to use equipment which has a measure of corrosion resistance.

The system as shown is very flexible, simple, and relatively inexpensive in consideration of its capacity. Any number of digesters or refiners can be used in such a system. In some installations, a hot chip tank is provided for each digester, but a single chip storage bin of this type can serve up to five or six cookers, and would have the additional advantage of maintaining a higher temperature of the pre-treated chips going to the fiberizing machine.

The size and number of digesters must be determined with relation to the requirements of tonnage, the time of cooking, and the quality of product desired. Spherical digesters are available in sizes ranging from 12 to 18 feet in diameter. A 16-foot diameter globe rotary will hold about eight cords of chips with the cooking cycle varying anywhere between one and one-half and eight hours; this means that each cooker can produce from 3 to 16 cooks in 24 hours of operation. The capacity of the system may be illustrated by two fairly extreme examples. Birch, a heavy hardwood, can be cooked to a yield of 85 percent at the rate of ten cycles per day; in such an operation, a 16-foot spherical digester would have a capacity of a 125 tons of air-dry pulp per 24 hours. On the other hand, a light softwood such as balsam fir may be cooked to produce a different type of end product, at the rate of four cycles per day to 70 percent yield; in this case a 16-foot globe cooker would have a capacity of 22½ tons per 24 hours.

In place of the batch operation represented by the spherical cooker and the hot chip bin, any successful continuous digester or steaming apparatus which is able to discharge to atmospheric pressure can be located immediately ahead of the revolving disk mills. In addition to probable economic advantages of a continuous operation, it would doubtless discharge chips to the fiberizing machines at higher temperatures. In connection with steamed wood, this might help in that it would be possible to fiberize the chips before they had regained part of their original hardness.

An intermediate between the globe rotary system and the continuous cooker is a small automatically operated cooker, employing high steam pressures for very short periods. The entire cycle of a system of this type could be completed in seven to fifteen minutes.

A considerable range in capacity of the revolving disk mills is experienced in connection with the processing of various species of wood for a variety of end products. In most cases, the capacity of a double revolving disk mill equipped with two 150 HP motors is in the range of 15 to 30 tons of air-dry product per day. But in extreme cases capacity ranges of from 10 to 60 tons per day have been achieved.

In many installations in which fiberizing equipment is preceded by steaming or semi-chemical cooking, it is unnecessary to wash out the soluable matter of the pulp. In such plants, the washing operation is dispensed with entirely. Where washing is required, the operation varies in accordance with the degree of cleanliness required. It may be accomplished (1) by adding water to the digester and draining it off, (2) by spraying water on the chips while they are conveyed from the digester to the hot chip bin, (3) by washing in the hot chip tank, which has been especially provided with a perforated bottom, or (4), especially if a thorough wash is desired, it may be performed after fiberizing with the conventional equipment used in the pulp and paper industry.

Products Utilizing Fiberized Wood

A few of the commercial outlets for fiberized wood are described in the following paragraphs.

Wallboard (insulating).—Currently operating wallboard plants are successfully obtaining fiber for their product by fiberizing, with revolving disk mills, a va-

riety of species of American and foreign woods, including white, jack, and yellow pine, Douglas-fir, balsam fir, red and black gum, willow, and aspen or poplar. In some of these installations, the disk mill comprises the sole means of fiber preparation; in others, the disk mills are used in conjunction with other means.

The pretreatment used in this industry varies with the species and a number of local factors. Spruce, balsam fir, aspen and some of the pines, in green or water-soaked condition, are being converted with disk refiners, without any pretreatment at all.

In the case of Douglas-fir, jack pine, and some of the yellow pines, the wood is given a steaming pretreatment or a mild semi-chemical cook prior to fiberizing.

Some of the hardwoods, such as gum and birch, in kild-dried condition, require a somewhat more drastic semi-chemical cook, resulting in a yield of approximately 80 pounds of dry pulp per 100 pounds of dry wood. Such fiber produces a superior quality of wallboard.

The power consumption in the above-mentioned applications varies from about 30 horsepower per ton per day down to about 12; this means that a disk refiner provided with 300 motor horsepower, will produce from 10 to 25 tons of air dry fiber per day.

Wallboard (hard pressed). — This is the product commonly known as hardboard. It is a highly specialized product and is prepared by a variety of processes. The board may be formed wet or dry, and may be sent to the heated platen press in either wet or dry form. Some of the processes rely completely on th wood to supply its own binder; in others, a binder is added, sometimes in the form of a synthetic plastic. The particular process employed determines the type of pretreatment and the fiberizing action required and both are subject to wide variations.

As previously noted, fiber from steamed wood produces a hardboard of superior water-resisting qualities, but on the other hand, excellent hardboard is being prepared from wood that has had no pretreatment at all. Both deciduous and coniferous woods are used in the manufacture of hardboard, and both are successfully handled in revolving disk mills.

Saturating Felt. — This product, chiefly used for roofing and for floor coverings, has traditionally been made from fibrous wastes of various kinds, especially old papers and rags. But the rag supply is unreliable and at times very expensive, so that in recent years fiberized wood has been employed to displace rags; in some cases a merchantable felt is currently being made from a furnish that contains no rags whatever.

The fiber strength requirement for this grade of product is not very exacting, although a certain minimum strength is required. Certain other qualities of fiber are of critical importance, especially its absorbency, which must be controlled within fairly narrow limits.

It has been found that excellent fiber for this purpose can be prepared from either hardwood or softwood by proper choice of preliminary treatment and fiberizing operations. Generally the wood is presteamed or given a very mild alkali cook, then fiberized at atmospheric pressure, using from 10 to 20 horsepower per ton per day in this operation. Without any other treatment, such fiber is ready to be mixed with fiberized waste paper and converted into felt.

Container Board.—Revolving disk mills have been used for about 20 years in the production of this grade of board, and in recent years this type of equipment has been increasingly used for the purpose. Most of the grades of board used for manufacturing fiber containers require more fiber-felting strength than is needed for wallboard or saturating felt, but for certain of these grades, notably corrugating board, the strength requirement is well within the range of what can be achieved by means of a combination of semi-chemical cooking and disk fiberizing. Wood from deciduous trees is used chiefly at present, and much of the current production of this type of material is predicated upon extracted chestnut chips and other waste wood.

The semi-chemically cooking for container board is frequently conducted with eight to ten percent of soda ash, sodium sulfite, or mixtures of the two, giving a yield of 80 to 85 percent. The cooked chips are then fiberized, using from 10 to 25 horsepower per ton per day for the job. The fiber so produced is ready for the paper machine, but is sometimes given an additional "preparation" treatment in the beater or the jordan, especially if cutting or shortening of the fiber is desired.

Fine Paper.—While experimental research work and some large scale semi-commercial tests have given uniformly high promise, there are at present no commercial installations producing fine papers from semi-chemical pulps. The data of the U. S. Forest Products Laboratory and of other sources indicate that a semi-chemical cook employing about 15 pounds of a mixture of sodium sulfite and sodium carbonate per 100 pounds of dry chips, will produce a pulp with a yield of about 70 percent of the weight of the original wood, and that about 15 horsepower days per ton are required for fiberizing the cooked chips. The resulting fiber may be bleached to a satisfactory brightness with the use of about 15 pounds of chlorine per 100 pounds of pulp.

Because of the nature of the end product in this case, the entire cooking and fiberizing operation will have to be conducted with more care than is necessary for the previously named products. The condition and type of wood will have to be selected, and the chips required should be of a uniformity comparable to that used in the chemically pulping operations.

Fiberizing of Miscellaneous Wood Wastes

In addition to fiberizing chips, disk mills may also be used in a limited way in the production of fiber from certain other byproducts of the wood-using industries.

Shavings.—The waste from a planing mill operating on coniferous species offers an excellent source of fiber for certain purposes. After fiberizing, it is being used successfully as a partial furnish for insulating board and, along with waste paper, may be used for the manufacture of saturating felt. However, the pulps prepared from shavings are inferior in strength to those obtained from conventional chips of the same species. The general comments concerning the preliminary treatment for chips will apply similarly in the processing of shavings.

Sawdust.—The sawdust produced in ordinary sawmilling operations constitutes a poor source of fiber. A considerable proportion of the fibers has been cut in the normal operation and many more of them have been injured. The pulp produced from sawdust is consequently of inferior quality and has value chiefly as a filler or partial furnish, when the remainder of the furnish has surplus fiber strength.

However, dry sawdust is an excellent raw material for the manufacture of wood flour.

Bark.—Most types of bark contain so little ordinary fiber that they cannot properly be considered as a source of fiber, although substantial tonnages of bark are being processed along with wood fiber. In many commercial

installations which involve the fiberizing of chips, with or without preliminary treatment, the bark which normally accompanies the log or slab is processed along with the wood. However, in the main, this practice is followed primarily to avoid the expense of bark removal and the bark is generally considered as, at best, a dead weight of inert material.

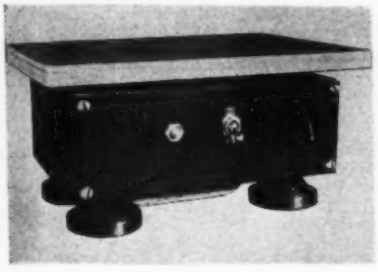
When processed through a revolving disk mill alone, bark is reduced, with very little power consumption, to a slimy mass, which drains very slowly and dries to a crinkly sheet, which is very brittle and apparently very weak. However certain types of bark, such as spruce, balsam and jack pine, have some constructive merits of their own for certain specific end products.

When bark is fiberized alone and then added to fiberized woods, as much as 25 percent bark can be included in the furnish of a wallboard machine without impairing the quality of the final product. Similarly, 10 to 15 percent of bark included with the wood used in a mild alkaline semi-chemical cook may be fiberized into a pulp for the manufacture of .009-inch thick board to be used for corrugating purposes. The corrugated product so produced is probably superior to a similar product made entirely from back-free wood.

EQUIPMENT AND SUPPLY

Portable Paper Jogger Added to Syntron Line

HOMER CITY, Pa.—As an addition to their line of paper joggers and vibratory packers, Syntron Company, 587 Lexington Avenue, Homer City, Pa., has produced a new small model with built-in variable control power, a 7" by 10" wooden deck standing 4½" high and weighing but 13 pounds.



The vibrating paper jogger is an extremely portable piece of equipment that can be used for a number of jobs —by the printer for jogging 8½" by 11" sheets prior to cutting, feeding or binding; in large offices aligning quantities of invoices for filing and gathering sales and service manuals. the electromagnetic design involves no motor, gears, bearings, lubrication, et cetera.

Literature and prices are available from the manufacturer.

Disston Designs Two New Chain Saw Features

PHILADELPHIA — Two new features concentrated in the engine and tail stock assemblies of the Disston Chain Saw include an automatic chain lubricator and a simplified *cradle balanced* tail stock.

The automatic chain lubricator on the engine has been designed to make the volume of oil to the chain entirely automatic and of sufficient pressure to prevent clogging of the line by sawdust and other foreign matter. The new pump is cam operated and will function in any position developing positive presure with each turn of the sprocket.

Easily refilled, the oil reservoir's capacity matches that of the fuel tank so that under ordinary operating conditions the chain lubricating oil supply will last as long as a tank of fuel. Any type of oil, even kerosene, may be used as a chain lubricant.

The tail stock has been completely redesigned to a smaller size without sacrificing strength. *Cradle balanced* and shaped to fit into the operator's arm, the body of the tail stock can be used as a fulcrum for maneuvering the saw in the cut. The new design is stronger than its predecessor, and its narrow lines make it easier to handle, a feature which, with the improved oiling, boosts the overall efficiency of the unit.

A higher safety factor is achieved by the manner of encasing which eliminates the slots that exposed the operator's fingers to the cutting chain. Added safety and convenience also are provided by making the tail stock quickly detachable.

Addition of a simplified tensioning device makes it possible to alter the tension of the chain through a wide range to suit individual requirements.

Complete details from Henry Disston & Sons, Inc., Tacony, Philadelphia 35, Pa.

Oakite's New Product Cleans and Deodorizes

NEW YORK—A new chemical material possessing the dual ability to clean and deodorize in a single, simultaneous operation has recently been marketed by Oakite Products, Inc. It is to be known as Oakite Di-Sanite.

A fine, free-flowing powder, mildly alkaline, readily soluble in hot or cold water, Oakite Di-Sanite is said to possess pronounced wetting, penetrating and detergent ability, as well as deodorizing action. The material is safe to use, free from abrasives and harmful ingredients, and its solutions may easily be applied on surfaces by simple sponging, wiping or mopping.

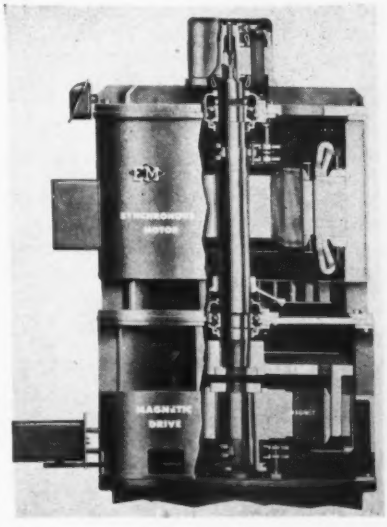
Suitable for use in practically every industry, Oakite Di-Sanite is said to be highly effective in destroying objectionable odors at the source in factories, metal plants, textile and paper mills, etc., also for deodorizing toilets, shower stalls, wash and locker rooms.

Di-Sanite is the second material combining both cleaning and deodorizing action to be developed by the Oakite organization during the last three years. Readers desiring data should address Oakite Products, Inc., 148A Thames St., New York 6, N. Y.

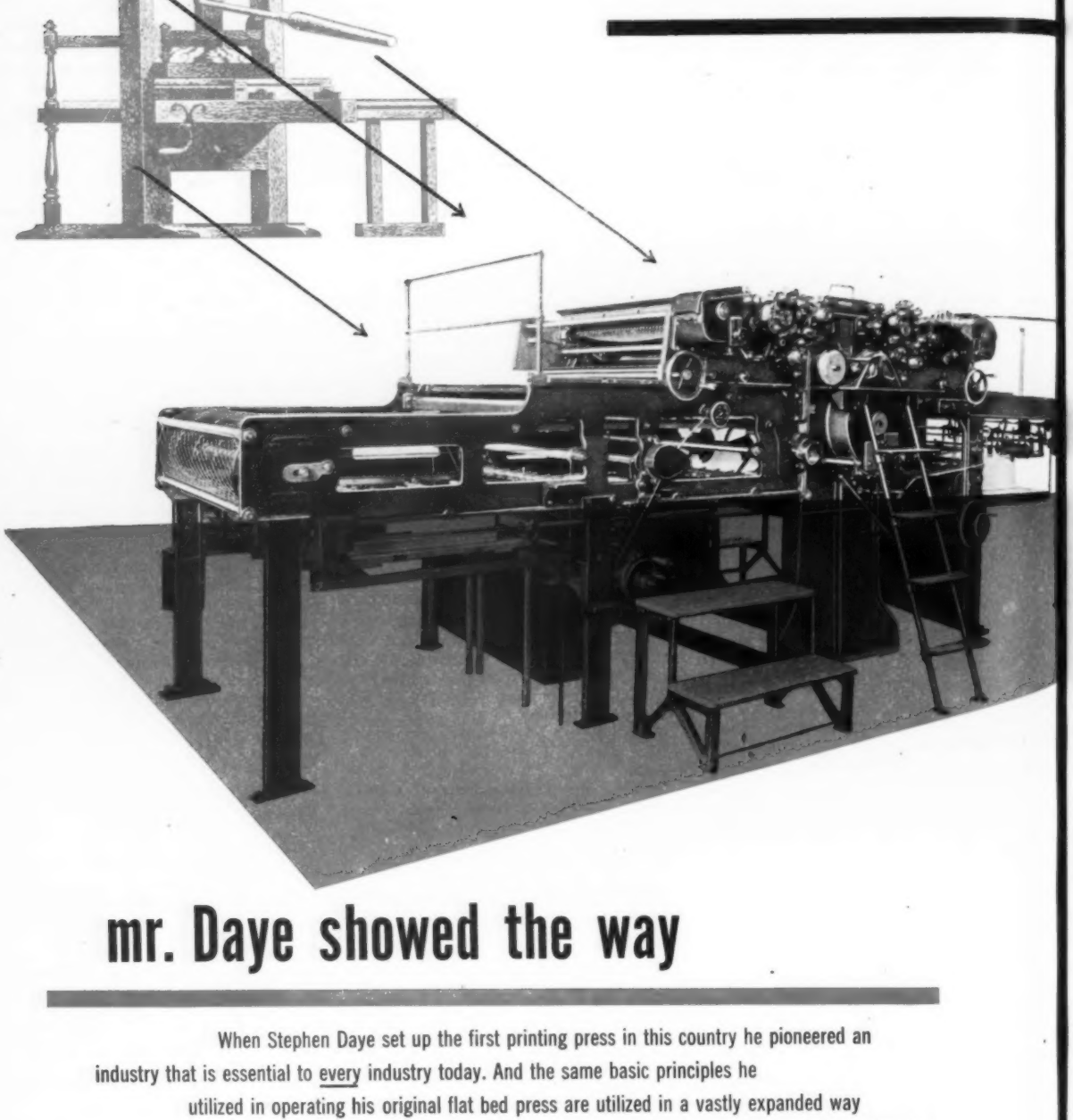
New Adjustable-Speed Vertical Drive Unit

MINNEAPOLIS—The newly available Vertical Synchronous Motor Magnetic Drive Unit, a product of Electric Machinery Manufacturing Company, Minneapolis 13, Minn., is said to give smooth adjustable speed control for centrifugal pumps. A motor drives the ring of the magnetic drive at constant speed while the magnet member of the magnetic drive mounted on gear shaft operates the pump at *speed required by liquid level control.*

Offering smooth, wide-range speed control, the unit precludes "hunting" and eliminates frequent motor starts and stops.



Cutaway shows 250 hp 1200 r.p.m. Vertical Synchronous Motor Magnetic Drive Unit, which operates 200 r.p.m. vertical sewage pumps through a reduction gear.



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122 E. 42nd ST., NEW YORK 17, N. Y. Edited By R. G. MACDONALD, Secretary

Plastics Testing in the Paper Mill Laboratory*

By J. C. Parsell[1]

Abstract

There is a growing need for standardized test methods covering the various uses of plastics in paper. Testing of resinous raw materials and resin treated papers are discussed. Wet-strength resin analysis and plastic coatings for paper are mentioned briefly. Development and production tests for beater addition, wet or dry web saturation and "off-machine" treating are described in greater detail. References to existing test methods which are satisfactory are given.

In the past few years there has been a rapid development of interest in plastics by the paper industry. Plastic coatings, wet strength paper, and high resin content paper for flat laminates and pulp preforms are the fields which have seen the biggest developments. New resins are constantly being offered to solve specific paper making problems. To the paper mill manager and chemist this often results in considerable confusion and uncertainty. The need for new test methods, materials and techniques due to the different properties of resins and plastics as compared to normal paper making materials is very evident.

Testing of resinous raw materials is the first step in adequate control of processes involving the use of resins. Properties of resin treated papers must also be measured and many new testing procedures are often required. Also, if the resin-paper combination contains thermo-setting resins, testing procedures will be required to evaluate cured material.

Raw Materials Testing

Resins for use in paper are available in a wide variety of physical forms. Powders, liquids, emulsions, organosols, and solutions in water or other solvents are a few of the forms in which they may be received. Since the resin content may vary over a wide range, probably the most important test is the determination of solids content in resinous solutions, emulsions, etc. Other tests which are useful for control purposes include specific gravity, refractive index, pH and viscosity.

Many special tests are needed for specific resins. For example, thermosetting resins such as phenolics, ureas, and melamine are subject to continuous enlargement of the resin molecules under the influence of heat and catalysts. This aging is evidenced by decreasing solubility of powdered resins and increased viscosity of liquid resins and their solutions. Hence solubility tests and viscosity determinations on the resulting solutions offer a means of measuring the aging of solid resins. With liquid resins viscosity changes are often great and the aging can be followed quite closely.

Other special tests are helpful in measuring rate of aging. An example to illustrate this is the so-called water soluble phenolic resins which are one-step phenolics reacted only to a low molecular weight so as to enhance the water solubility. Often these resin solutions may be diluted infinitely with water when freshly prepared. However, after standing the water dilutability decreases, rapidly at first, and then much more gradually. Most commercial water soluble phenolics, as received, have dilution ratios of from 300 to 1000%, but a few weeks at room temperature will lower this considerably. Eventually the water tolerance at a given temperature will reach zero after which a separation into two phases occurs. Percentage of free formaldehyde in phenolic resins is another measure of the properties of the resin and is subject to variation due to aging as is the case with water tolerance.

Thermoplastic resins in the form of powders, solutions, or emulsions are not subject to changes because of aging as are thermosetting resins. Therefore, once a series of tests have been made one can be reasonably sure that the same properties will exist at a later date. In the case of emulsions there is always a possibility of breaking because of impurities which may be introduced or due to freezing. Thus, emulsions should be stored with proper precautions and periodic checks should be made to determine the condition of the material.

Test methods for the evaluation of resin content, viscosity, water tolerance and the other tests mentioned may be found in various manuals on plastics such as D'Alelio's *(5)*. Whenever possible, methods should follow TAPPI Standards or A.S.T.M. However, many laboratories may not be equipped with or cannot afford to purchase standard equipment, but may nevertheless use revised procedures which will give satisfactory results.

Wet Strength Paper

There has been a marked increase in the production of wet strength papers in recent years and most of the emphasis has centered on melamine-formaldehyde and urea-formaldehyde resins. New testing procedures required for this type of work are for the main part restricted to the identification of the resin and determination of the amount in the paper. The recent proposed revision of TAPPI Standard T418 *(11)* on Organic Nitrogen in Paper includes factors for determining melamine and urea resins. However, as pointed out

* Presented at the meeting of the TAPPI Plastics Committee held at Syracuse, N. Y., Sept. 25-26, 1947.
[1] Chief Chemist, J. P. Lewis Co., Beaver Falls, N. Y.

in the standard, these factors for converting per cent nitrogen to per cent of nitrogenous resin are variable and should be determined by running separate nitrogen analyses on the resins. Also, it is well to point out that the factors are useless if more than one nitrogenous material is present unless the relative amount of each can be determined.

Identification of the nature of the wet strength treatment is important in examining competitive samples, waste paper containing wet strength waste, and perhaps unidentified broke. Methods for differentiating between melamine and urea resins and other nitrogenous components in paper have been published. Britt's method *(4)* is based on the difference in rate of hydrolysis of wet strength agents under varying conditions of pH, while the method of Stafford, Thomas, Williams, and Woodberry *(13)* is based on specific tests for each type of wet strength material. By this latter method melamine resins are identified by a dye staining technique, and the xanthydrol test is specific for urea and thiourea resins. Other tests are available for detection of proteins and other wet strength products.

Thus with the processes now available it is possible to obtain reliable identification of nitrogenous resins and other wet strength materials in a reasonably short length of time. Also, the quantitative amount of wet strength material present may be determined in many cases.

Coated Paper

Plastic coatings are applied to paper to impart decoration and surface protection or as a means of combining to a second surface by heat or pressure sealing. The use of various lacquer coatings, hot melts, and laminating solutions has been investigated thoroughly by Speyer *(12)*. Among the polymers commonly used in coatings are vinyls, acrylics, polystyrene, synthetic and natural rubber compounds, urea resins, and cellulose derivitives. These may be applied in the form of solutions, emulsions or hot melt compositions.

Usually only a relatively small percentage of coating is applied. Thus it is difficult to measure the exact resin content by extraction methods because of the high magniture of possible error. Probably the simplest means of determining resin content is by measuring the rate of consumption of resin per unit of weight of coated paper.

Most of the properties of coated paper do not vary sufficiently from uncoated paper to necessitate new testing procedures. Most improvements which may result from a surface resin treatment can be measured by TAPPI Standard testing procedures.

Impregnated Paper

When resins are dispersed throughout a sheet either by beater addition or by saturation of the wet or dry web of paper, the resultant treated product may have properties entirely different from normal paper. Normally, the product from the paper machine is not in its final form and subsequent lamination or molding under heat and pressure is required to develop the optimum properties. The point of addition of the resin is governed by the equipment available and the intended application. In most cases phenolic resins or extended phenolics are used for high resin content applications. The use of rubber latex in paper to produce a leather-like product is an entirely separate field and will not be discussed in this paper. Other resins such as vinyls and acrylics have been used as beater additives in comparatively small percentages to impart toughness, abrasion resistance and greaseproofness to paper. Urea resins applied in the beater or headbox are said to improve the retention of fillers such as titanium dioxide. However, because of their properties and relatively low cost, phenolic resins are most extensively used.

The methods for combining phenolic resins and paper have been covered very well in a report by Bauer *(3)*. Briefly these consist of beater addition, saturation of the paper web at either the met end of the machine or near the dry end and "off-machine" treating. In the case of "off-machine" treating there is no change in the standard paper making procedure, the paper being saturated in a separate operation on a standard treating machine. This is the oldest and most standardized method of producing paper laminates. The electrical industry through its needs for insulating materials led the way in this method of producing laminated plastics. Properties of the various grades of laminates have been standardized, and standards as well as test methods used to measure the properties of the laminates have been published by N.E.M.A. and A.S.T.M. as well as by various government agencies.

Paper for impregnation by the "off-machine" method usually does not receive the resin treatment at the paper mill. However, in order to be used for resin impregnation, a paper must have certain general characteristics. Absorbency, uniform formation, density, weight and caliper, freedom from objectionable impurities and sufficient strength for subsequent processing are among the important properties. Reports by Barber *(2)* and Larsen *(9)* have covered the specifications for various papers used in the laminating industry. However, as pointed out by Jackson *(7)*, there is no test or set of tests which will replace actual use of the paper in the process. Indications of suitability may be obtained, but the treating machine and laminating press give the final answer.

Beater Addition

Addition of resins to pulp in the beater followed by subsequent forming into a continuous sheet or into pulp preforms has very interesting possibilities providing adequate control of the entire process can be developed. Selection of pulp and resin combinations is a problem which must be solved by each mill. Small scale laboratory tests do not usually give a very good indication of plant scale operation. The major problems involved are retention, sheet formation, and drying, none of which can be adequately studied in the laboratory. Hence, the slow and expensive process of full scale experimentation is ofen the only way to develop a satisfactory product.

Education of the beater room and paper machine workers to observe extra care when working with expensive resins is a prime necessity. All materials must be measured carefully into the beaters to insure uniformity of the furnish. Beater room tests should be made on each beater for freeness, consistency, and pH. The proper sequence of addition of the furnish to the beaters must also be checked closely.

Poor retention of costly resin is the argument most often heard against beater addition. Naturally, a closed or nearly closed white water system is essential. However, most experimental work must be done without the benefit of a closed system since the length of the run is usually too short to reuse the white water. Testing of the white water for total suspended solids and dissolved solids together with measurement of white water volume should be made before and after the "saveall" filters. Analysis of white water solids for resin content by extraction with appropriate organic solvents will provide useful information and will enable closer calculation of beater furnishes in subsequent longer runs when

white water may be reused.

More often than not foaming difficulties will be encountered at various points in the wet end system of the paper machine, and foam-suppressors are not necessarily the answer to this problem. For this reason, some resins are entirely unsatisfactory for beater addition in spite of the fact that they may be excellent otherwise.

Sheet formation and drying is a problem for the machine tender who should work closely with the control laboratory. The addition of large quantities of resins to pulp generally makes the stock slower, and also decreases the strength of the pulp just as large quantities of fillers do. In order to overcome this weakening, the pulp-resin mixture should contain long fibered stock. On the other hand too much long fibered, free pulp is not conducive to the best retention of resin, so a balance must be attained. The drying operation consists not only of evaporation of water from the wet sheet, but also advancement of resin to the proper range of molecular size most suitable for hot pressing. Drier temperatures must be controlled adequately and proper precautions taken to prevent fouling of the drier surface. This fouling is caused by melting of the resin particles, which then stick to the driers, cure and interfere with subsequent drying.

Volatile content is probably a more important test than moisture content for phenolic treated paper since it indicates not only the free water in the sheet but also the water liberated by curing of the resin. Loss of weight resulting from oven drying at around 180° C. for 3 to 5 minutes is a means of determining volatile content. Resin content may be obtained by extraction methods using a solvent suitable for the resin being extracted. However, advancement during drying may result in only partial solubility of the resin. This is, in fact, the basis of the acetone solubility test which may be used to determine the degree of precure in phenolic treated laminating stock.

Machine Addition

Saturation of paper with resin may be accomplished on the paper machine by the "wet-web" or Novak process *(8, 10)* or at the size press. These methods may also be used for surface enrichment of sheets containing beater added resin. Water solutions or emulsions of resins are generally used. Retention is a minor problem in the "wet-web" process and partically complete retention may be obtained in the case of the size press treatment. Generally the same operating techniques are used and the same control tests required as with beater addition. Better sheet formation is more easily attained and short experimental runs may be made more conveniently. Tests on the base paper for saturating qualities will aid in the selection of the proper resin and paper combination. There are many penetration test methods and testers available which are applicable for this purpose.

Laminating

Some mills may desire to do their own laminating instead of marketing treated paper. This involves a separate operation and should be entirely apart from the paper machine. Techniques are much different from anything else normally encountered in paper mill operation, so that workers must be trained specifically for this operation. No set rules can be given for hot pressing procedures since wide variations may be required depending on the nature of the product. Testing of the resulting laminated product requires much heavier equipment than that used in paper laboratories. Tests most generally made include tensile, flexural, compressive and bonding strengths, moisture absorption, density, dimensional stability, and resistance to chemicals, heat, and abrasion. These tests have been standardized by A.S.T.M. *(1)* and the Federal Government *(6)* and test manuals may be obtained from either source.

Conclusion

In general, it is to be expected that paper treated by the beater or machine method is not subject to the degree of control possible in "off-machine" treating. Hence, the resulting laminated product may not measure up to the requirements of such fields as the electrical industry. However, the high cost of "off-machine" treatment results in excluding this material from many applications. Where good mechanical properties are important and electrical properties of only secondary importance, the low cost of beater and machine treatment may open new markets. The need for new test methods is obvious. Technical men now engaged in this type of work are developing their own test methods for their particular process. However, standardization of test methods should be possible and would be of great assistance to workers in this field as well as to the entire paper industry.

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Chemical Components of Wood

The Technical Association of the Pulp and Paper Industry, has just issued its Monograph No. 6 on "Nature of the Chemical Components of Wood" (234 pp 6 x 9).

The contents consists of the information brought out at the symposium on the subject presented at Appleton, Wis., in September 1947 under the sponsorship of the Fundamental Research Committee of the Association. The monograph is remarkable in its thorough and fundamental coverage of the chemistry of cellulose and lignin. At no previous time did so many eminent authorities gather together for the express purpose of bringing these complex subjects up to date.

Among the major subjects covered are: Unsolved cellulose problems; the hemicelluloses, structural analysis of the polysaccharides, gums and mucilages; the proven chemistry of lignin, wood tannin, wood resins, the natural coloring matters in wood, and structure and synthesis of Gymnosperm lignin.

The symposium was under the direction of Harry F. Lewis of the Institute of Paper Chemistry and monograph was edited by Clarence J. West of the Institute.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York 17, N. Y., at $5.00 in the United States ($6.00 per copy elsewhere).

The Separation of Lignin Sulphonic Acids from Sulphite Waste Liquor by Batch Dialysis*

By Nevin K. Hiester[1], Joseph L. McCarthy[2], and H. K. Benson[3]

Abstract

A procedure is described by means of which calcium lignin sulphonates can be prepared in high purity and in substantial yield by direct dialysis of sulphite waste liquors. Other water soluble salts, or the free acids, may be secured from calcium lignin sulphonates by use of cation exchange resins. By these procedures, purified lignin sulphonic acids and their salts may readily be prepared in amounts sufficient to permit the substances to be laboratory tested for various utilization applications. A few preliminary values for specific gravity viscosity, and surface tension are recorded.

Those proposals for utilization of sulphite waste liquor which do not involve burning of the solids do in many cases rely upon certain physical properties and chemical reactions characteristic of the lignin sulphonates. Although these compounds comprise only about 60 % (*1*) of the nonvolatile solid substances present, the literature indicates that nearly all use studies from this viewpoint have been carried out on the whole sulphite waste liquor which, in addition to the lignin sulphonates, primarily contains sugars, carboxylic and probably sulphonic acid derivatives of sugars, as well as inorganic substances.

With the hope that it may be found helpful as a means for preparing purified lignin sulphonates in amounts sufficient to permit laboratory testing in various utilization applications, in this paper a dialysis procedure is suggested as an easily and fairly rapidly carried out laboratory method starting with calcium base sulphite waste liquor.

An increase in the concentration of calcium lignin sulphonates to 70 or 75% of the total solids can be secured by converting the fermentable sugars present in sulphite waste liquor to ethanol, yeast, or other substances. In this case, however, nonfermented sugars and their derivatives, and inorganic substances remain with the lignin sulphonates as contaminants.

Separation of insoluble lignin sulphonates as calcium, lead, or amine salts, (*2,3,4,5,6*), or of insoluble lignin sulphonic acids from strongly acidic solutions (*7*), has several times been reported. However, it has been found in these Laboratories (*8*) that in at least some of these systems, the precipitated lignin sulphonic acids or salts are accompanied and contaminated by other substances which are probably at least in part sugar sulphonic acids (*9,10*). Also, not all of the lignin sulphonates in sulphite waste liquor are recovered as precipitates, the proportion depending rather widely on the reagent and the experimental conditions.

Dialysis of sulphite waste liquor was proposed by Mitscherlich (*11*) in 1893, and among several recent studies especially may be mentioned one by Ogland (*12*) who has reported some mass transfer capacity data with respect to operations on an industrial scale.

The dialysis method of preparation of purified lignin sulphonates succeeds by reason of the existence of a difference in rate of passage through the capillaries of a membrane between the relatively large lignin sulphonate molecules versus the considerably smaller molecules of sugar and inorganic impurities. Because it appears that the only relatively large molecules present in sulphite waste liquor are lignin sulphonates (*8,13*) exhaustive dialysis permits removal of the low molecular weight impurities and leaves behind most of the lignin sulphonates in purified form.

Experimental

Analytical Methods

Total solids were calculated from the weight of

* Presented at the meeting of the TAPPI Chemical Products Committee, Asheville, N. C., October 9-11, 1947.

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TABLE I.—COMPOSITION OF PURIFIED CALCIUM LIGNIN SULPHONATE SOLUTIONS PREPARED BY SULPHITE WASTE LIQUOR DIALYSIS

	Concentration in Solution						Analyses of Total Solids [a]					Estimated Composition of Solids		
Time of Dialyses, hr.	Total Solids, g./l.	Methoxyl, g./l.	Total Sulphur, g./l.	Calcium Oxide, g./l.	Ash as CaO, g./l.	Reducing Sub., g./l.	Methoxyl, %	Total Sulphur, %	Calcium Oxide, %	Ash as CaO, %	Reducing Sub., %	CaL S[b] %	Sugars[c] %	Other[d] %
0	96.8	8.16	8.48	7.43	15.4	8.62	8.42	8.8	7.7	15.9	8.9	68	4.9	27.0
213	43.7	4.83	2.80	2.62	5.06	2.00	11.1	6.4	6.0	11.6	4.6	89	0.6	10.4
241	34.6	3.95	2.08	1.91	4.19	...	11.4	6.0	5.5	12.1	..	91	(0.5)	8.5
306	20.1	2.37	1.22	0.92	2.43	0.87	11.8	6.1	4.6	12.1	4.3	94	0.3	5.7
335	18.7	2.26	1.16	0.83	2.12	...	12.1	6.2	4.4	11.3	..	97	(0.2)	2.8

[a] Taking the proportions of 6.2% S, 4.4% CaO, 4.0% reducing substances calculated as glucose, and 12.5% methoxyl as characteristic of this calcium lignin sulphonate if, ultimately purified, then the number of equivalents of each of these groupings per methoxyl grouping is as follows: sulphur, 0.48; calcium, 0.38; and carbonyl, 0.55.

[b] Graphical extrapolation of methoxyl content to infinite time of dialysis indicated 12.5% methoxyl is present in this calcium lignin sulphonate on the basis of this methoxyl content, the proportion of calcium lignin sulphonate in the solids was estimated.

[c] Graphical extrapolation of reducing substances content to infinite time of dialysis indicated that 4.0% of reducing substances calculated as glucose is associated with calcium lignin sulphonates. Thus the "sugars" content of solids was taken as the observed percentage of reducing substances minus 4.0%.

[d] "Other" substances were calculated by taking the difference between 100% and the sum of the percentages present of calcium lignin sulphonate and sugars."

nonvolatile solids remaining after drying an aliquot of sulphite waste liquor to substantially constant weight under 15 mm. Hg pressure at 60°C. (*14*).

Methoxyl was determined by the method of Zeisel (*15*) as modified by Clark (*16*) and by Vieboch and Schwappoch (*17*).

Total Sulphur analyses were carried out by an unpublished method suggested by Dr. F. H. Yorston of the Canadian Pulp and Paper Research Institute involving wet oxidation of organic substances and of sulphur to sulphate using a zinc nitrate-nitric acid mixture as the oxidant. Calcium is then replaced by sodium on an ion exchange column and sulphate is determined (*18*) by a conductometric titration with standardized barium chloride solution.

Calcium Oxide: A sulphite waste liquor sample is dried and ashed, the ash is dissolved in oxalic acid, the solution neutralized and the precipitate is filtered out, acidified, and titrated with standardized ceric sulphate solution.

Ash: An aliquot portion of the sulphite waste liquor was dried and then ignited to constant weight at about 600° C. in a muffle furnace.

Reducing Substances: A modification of the Munson and Walker procedure (*19*) was used, modified to permit volumetric estimation by means of ceric ammonium sulphate of reduced copper after separation of the latter from the original reactants.

Preparative Methods

Dialyses were conducted using a fermented calcium base sulphite waste liquor. Its composition is given in Table I. This was dialyzed in a cellophane sack (Visking sausage casing calipering 0.0017 inches) suspended within a cylindrical tube of Saran screen which served as a lateral support for the membrane. The lower half of the sack and the Saran screen was enclosed in a 4-inch diameter Pyrex glass tube, 4 feet long and stoppered at the bottom. The upper half of the sack was thus available for changes in volume of sulphite waste liquor resulting from osmosis. The lower half of the sack was then filled with the sulphite waste liquor charge and distilled water was passed around the outside of the sack by introducing it at the bottom of the Pyrex tube and allowing it to overflow at the top. Stirring of the sulphite waste liquor, although not done in these experiments, is desirable because it substantially shortens the time required for completion of dialysis.

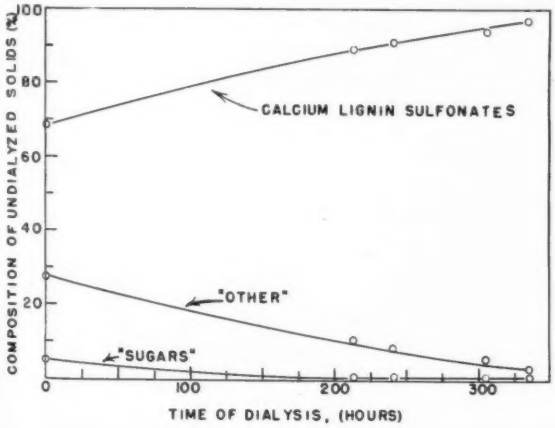

FIG. 1
Estimated composition of fermented sulphite waste liquor after various periods of dialysis

TABLE II.—PRELIMINARY SPECIFIC GRAVITY DATA FOR SOME AQUEOUS LIGNIN SULPHONATE AND LIGNIN SULPHONIC ACID SOLUTIONS

(Experiments by F. A. Ferguson and V. W. Reeves)

Samples [a]	Concentration, grams/liter	Specific Gravity [b]
Calcium lignin sulphonates	21	1.001
Calcium lignin sulphonates	41	1.009
Calcium lignin sulphonates	82	1.021
Calcium lignin sulphonates	164	1.045
Sodium lignin sulphonates	3.7	0.9980
Sodium lignin sulphonates	7.3	0.9992
Sodium lignin sulphonates	14.5	1.002
Sodium lignin sulphonates	28.9	1.008
Sodium lignin sulphonates	57.1	1.020
Lignin sulphonic acids	2.4	0.9980
Lignin sulphonic acids	4.8	0.9987
Lignin sulphonic acids	9.5	1.0005
Lignin sulphonic acids	19.0	1.004
Lignin sulphonic acids	32.1	1.010

[a] The sample of calcium lignin sulphonates was purified by dialysis and kindly supplied by Dr. Quintin P. Peniston of the Pulp Mills Research project of these laboratories. Sodium lignin sulphonate and lignin sulphonic acids were prepared by Dr. Peniston from the calcium salt by use of Dow Ionex 2 operated on a sodium or hydrogen cycle.

[b] Specific gravity of solutions of calcium salts was determined at 23 ±1° C. by F. A. Ferguson by use of a Westphall balance. Data for sodium salts and free acids was obtained at 25 ±2° C. by V. W. Reeves by use of a 25 ml. pycnometer.

Using conditions as nearly identical as possible a series of dialyses was carried out for varying periods of time. At the end of each experiment, the purified lignin sulphonate samples were analyzed for methoxyl, total sulphur, calcium oxide, ash, reducing substances, and total solids with results as listed in Table I and shown in Fig. 1.

Cation exchange of calcium lignin sulphonate solutions was carried out with the commercial resins Amberlite IR 100 or Dow Ionex 2. Using a sodium or a hydrogen cycle under conditions recommended by the manufacturer a resin served to produce sodium lignin sulphonates or lignin sulphonic acid solutions, respectively, to be used for physical characterization of the salts. When necessary, solutions were concentrated under pressure of about 15 mm. Hg.

Preliminary Physical Measurements

Specific gravity of calcium lignin sulphonate solutions was determined by F. A. Ferguson (*20*) using a Westphal balance, and of sodium lignin sulphonate and lignin sulphonic acid solutions by V. W. Reeves (*21*) (Table II) with a 25 ml. pycnometer.

Viscosity of sodium lignin sulphonate and of lignin sulphonic acid solutions was determined by V. W. Reeves (*21*) in an Ostwald type viscometer found to permit outflow of distilled water at 25.00±.05° C. in 4.268 minutes. (Table III and Fig. 2).

Surface Tension of calcium lignin sulphonate and of lignin sulphonic acid solutions was determined by F. A. Ferguson (*20*) by the "capillary rise" method at 25.0±0.2° C. and at several temperatures. Radius of the capillary was 0.0319 centimeters. (Table IV and Fig. 3).

Discussion

The concentration of calcium lignin sulphonates in the undialyzed solids increases with increasing time of batch dialysis as shown in Fig. 1. In this case a close approach to a completely purified calcium lignin sulphonate was obtained at about 350 hours of dialysis. Sugars and other impurities were being removed as dialysis proceeded. Most fermentable sugars had already been separated from this sample by prior fermentation and remaining sugars were fairly rapidly removed. The "other" substances which dialyzed are believed to be mostly aldonic and sugar sulphonic acids and also calcium salts of inorganic sulphur acids.

The rate of batch dialysis for a particular substance from an aqueous solution through a membrane into

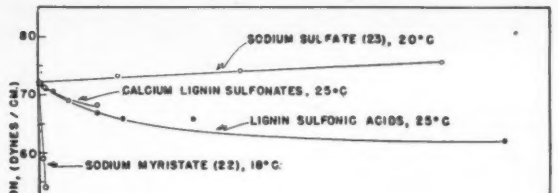
SODIUM SULFATE (23), 20°C
CALCIUM LIGNIN SULFONATES, 25°C
LIGNIN SULFONIC ACIDS, 25°C
SODIUM MYRISTATE (22), 18°C
SODIUM OLEATE (22), 20°C
SURFACE TENSION, (DYNES / CM.)
CONCENTRATION, (GRAMS / LITER)

FIG. 3
Surface tension of aqueous calcium lignin sulphonates and lignin sulphonic acid solutions at various concentrations

pure water is controlled primarily by the following equation:

$$\frac{dw}{d\theta} = k_s \cdot \frac{(k_m)}{(t)} \cdot \frac{(AC)}{(V)} \qquad (1)$$

where: $\frac{dw}{d\theta}$ = rate of dialysis, grams passing through the membrane per minute.
k_s = dialysis rate constant.
k_m = membrane permeability constant.
t = thickness of the membrane, centimeters.
A = area of the membrane available for dialysis, square centimeters.
V = volume of solution being dialyzed, cubic centimeters.
C = concentration in solution of the substances being dialyzed, grams per liter.

This equation is essentially a statement of Ficks' diffusion law and applies to the dialyzable substances in solution. Thus all of the latter will dialyze more rapidly with increase in (a) the ratio $\frac{A}{V}$, i.e. the area of the membrane per unit volume of the solution being dialyzed, and (b) the ratio, $\frac{k_m}{t}$, i.e. the permeability of the membrane at unit thickness. On the other hand with a particular membrane and apparatus, each substance will dialyze at its own special rate which is determined by the concentration of this substance, C and also by the dialysis rate constant of this substance, k_s. The dialysis rate constant in general decreases as the molecular size of a substance increases. Stirring of the solution being dialyzed will greatly increase the rate of dialysis because in this manner, the thickness of the liquid "film" next to the membrane surface is decreased. By taking account of these factors in apparatus design, the total time required for purification of calcium lignin sulphonate can be decreased considerably.

The degree of dilution of the dialyzing solution with water which passes through the membrane is also determined by equation 1 except here the symbol "C" refers to the osmotic pressure existing between the solution being dialyzed and ambient water.

The specificity of dialysis, or the rapidity with which substantially complete separation of two or more substances can be accomplished, depends particularly upon the differences existing between dialysis rate constants of each substance being dialyzed. This dialysis rate constant is closely related to the free diffusion coefficient for a particular substance and methods for the design of continuous dialyzers based upon data for free diffusion coefficients and upon membrane characteristics are now being studied by Mr. Robert Davis in these Laboratories.

From Table I and Fig. 1, it is apparent that all, or nearly all, of the nonlignin substances present in sulphite waste liquor may be removed by dialysis to leave behind substantially pure calcium lignin sulphonates. However, in other work in these Laboratories *(8)*, it has been found that about 20 to 35% of the weight of the calcium lignin sulphonates originally present in sulphite waste liquor passes through the membrane into the dialyzate and that the calcium lignin sulphonates retained by the membrane and purified by dialysis comprise the higher molecular weight fraction of the total lignin sulphonates in sulphite waste liquor. It is the low values of the dialysis rate coefficients of this fraction of the calcium lignin sulphonates compared to the relatively high dialysis rate coefficients of the nonlignin substances in sulphite waste liquor which permits separation and purification of calcium lignin sulphonates by direct dialysis.

The purified calcium lignin sulphonates have in part been characterized chemically as shown by analyses of undialyzed solids given in Table II. By extrapolation to infinite time of dialysis, the methoxyl content of this fully purified calcium lignin sulphonate is estimated to be about 12.5% and this value has been used as a basis for the very rough estimations of the composition of undialyzed solids as indicated in Table I. This matter will be discussed in more detail in a later report but at present it seems desirable to mention that the methoxyl content appears to vary between about 12 and 13% in purified calcium lignin sulphonates prepared from sulphite waste liquors from different sources.

Application of the technique of cation exchange to solutions of calcium lignin sulphonates to prepare other salts or lignin sulphonic acids has been found simple and effective. For example, a cation exchange resin having been regenerated with sodium chloride is placed in a vertical tube and an aqueous solution of calcium lignin sulphonates is permitted to flow slowly over the resin; calcium remains attached to the resin and a sodium lignin sulphonate solution is withdrawn from the bottom of the tower.

Some preliminary physical measurements have been made on purified lignin sulphonates and lignin sulphonic acids by F. A. Ferguson *(20)* and V. W. Reeves *(21)* working with one of the authors. Specific gravity and viscosity characteristics of aqueous solutions are given in Tables II and III and in Fig. 2. The viscosity data has been correlated in Fig. 3 by plotting specific viscosity against concentration and the resulting nearly linear relationships are approxi-

TABLE III.—PRELIMINARY VISCOSITY DATA [a] FOR SOME AQUEOUS SODIUM LIGNIN SULPHONATE AND LIGNIN SULPHONIC ACID SOLUTIONS
(Experiments by V. W. Reeves)

Samples [b]	Concentration, grams/liter	Outflow Time, [c] minutes	Relative [d] Viscosity	Specific [e] Viscosity
Sodium lignin sulphonate	3.7	4.412	1.035	0.035
Sodium lignin sulphonate.	7.3	4.560	1.071	0.071
Sodium lignin sulphonate.	14.5	4.816	1.134	0.134
Sodium lignin sulphonate.	28.9	5.138	1.217	0.217
Sodium lignin sulphonate.	57.1	5.897	1.414	0.414
Lignin sulphonic acids...	2.4	4.371	1.024	0.024
Lignin sulphonic acids...	4.8	4.417	1.037	0.037
Lignin sulphonic acids...	9.5	4.540	1.066	0.066
Lignin sulphonic acids...	19.0	4.828	1.139	0.139
Lignin sulphonic acids...	32.1	5.096	1.210	0.210

[a] 25 ±0.05° C.
[b] Samples were prepared by Dr. Quintin P. Peniston under conditions similar to those set forth in footnotes of Table II.
[c] Outflow time recorded is that apparently most probable as taken for each case from a graph of individual observed results versus frequency of occurrence. Outflow time for distilled water was 4.268 minutes.
[d] Relative viscosity is outflow time for solution minus outflow for water.
[e] Specific viscosity is relative viscosity minus one.

mately expressed at 25± 0.05°C. by the following emperical equations; i.e. for sodium lignin sulphonate solutions over a range of concentration, *C*, from 4 to 57 grams per liter.

$$\text{Specific viscosity} = 0.009 + 0.0069\ C \qquad (2)$$

and for lignin sulphonic acid solutions from a concentration of 3 to 32 grame per liter,

$$\text{Specific viscosity} = 0.004 + 0.0062\ C \qquad (3)$$

Surface tensions of some aqueous solutions of calcium lignin sulphonates and lignin sulphonic acids have also been determined *(20)* and the results are given in Table IV and plotted against weight concentration in Fig. 3 along with literature data for sodium oleate *(21)*, sodium myristate *(22)*, and sodium sulphate *(23)*. From this graph it is seen that the surface tension of water is not greatly lowered by the presence in solution of purified calcium lignin sulphonates or lignin sulphonic acids and that these solutes give rise to surface tension characteristics falling between those brought about by presence of simple electrolytes such as sodium sulphate, and of good soaps such as sodium oleate. Assuming an oxygenated guaiacyl propane type of a polymeric structure for lignin sulphonic acids, these results suggest that polar sulphonate groupings are probably distributed more or less uniformly on the polymer.

Summary

1. Direct batch dialysis of sulphite waste liquor has been found to be a readily carried out procedure which may be used to obtain purified calcium lignin sulphonates in amounts sufficient to permit the substances to be laboratory tested for various utilization applications. Other salts or lignin sulphonic acids may be obtained by cation exchange procedures using appropriate resins.

2. Some preliminary values for specific gravity, viscosity, and surface tension of aqueous solutions of purified calcium and sodium lignin sulphonates, and lignin sulphonic acids have been determined.

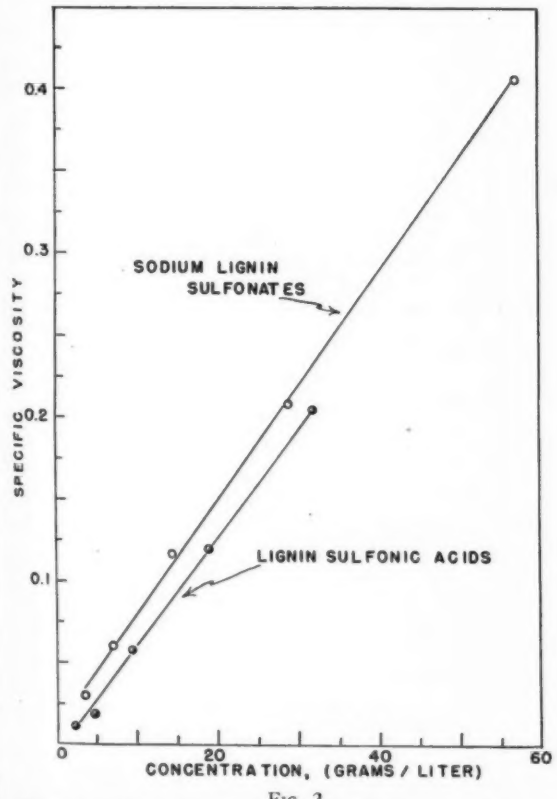

FIG. 2
Specific viscosity of aqueous sodium lignin sulphonates and lignin sulphonic acid solutions at various concentrations

TABLE IV.—PRELIMINARY SURFACE TENSION DATA FOR SOME AQUEOUS CALCIUM LIGNIN SULPHONATE AND LIGNIN SULPHONIC ACID SOLUTIONS
(Experiments by F. A. Ferguson)

Sample [a]	Temperature,[b] ° C.	Concentration, grams/liter	Surface Tension, dyne/centimeters
Calcium lignin sulphonate....	25	1.3	71.5
Calcium lignin sulphonate....	25	1.9	71.4
Calcium lignin sulphonate....	25	3.4	71.2
Calcium lignin sulphonate....	25	10.3	69.0
Calcium lignin sulphonate....	25	20.6	68.3
Lignin sulphonic acids.....	25	5.0	70.5
Lignin sulphonic acids.....	25	20.5	66.8
Lignin sulphonic acids.....	25	29.8	65.8
Lignin sulphonic acids.....	25	54.6	65.8
Lignin sulphonic acids.....	25	164	62.0
Lignin sulphonic acids.....	20	3.4	70.4
Lignin sulphonic acids.....	18	3.4	70.7
Lignin sulphonic acids.....	16	3.4	70.8
Lignin sulphonic acids.....	14	3.4	71.0
Lignin sulphonic acids.....	12	3.4	71.4

[a] Samples were prepared by Dr. Quintin P. Peniston under conditions similar to those set forth in footnotes of Table II.
[b] 25 ±0.05 for first two series of experiments; about ±0.2 for third series.

Acknowledgement

The authors appreciate the assistance of Dr. Quintin P. Peniston of the Pulp Mills Research project of these Laboratories and also the kind grant of a Research Fellowship to one of the authors (N.K.H.) by the Engineering Experiment Station of the University of Washington.

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TAPPI Notes

George W. Brumley is now mill manager of St. Marys Kraft Corporation, St. Marys, Ga.

L. W. Williams, field engineer of the Minneapolis Honeywell Regulator Company has been transferred from Albany, N. Y. to 122 N. E. Broadway, Portland, Ore.

Norman B. Gibbs, formerly of Brooks-Scanlon Company is now consulting engineering, 122 East 42 Street, New York 17, N. Y.

John L. Perkins III has succeeded William Woosnam as official representative of B. F. Perkins and Son Inc., Holyoke, Mass., in the Technical Association.

Printing Smoothness of Paper*

TAPPI Suggested Method 7 479 sm-48

This method covers the determination of the smoothness of printing paper by three different instruments: the Bekk, the Gurley-Hill S-P-S, and the Williams.

No constant relationship has been developed between the test values obtained by these instruments; consequently, in reporting results the name of the instrument used must be designated.

In every case the test speciments shall be taken in such a manner as to accurately represent the sample, which shall be selected in accordance with TAPPI Standard T 400 m. Test specimens shall be clean and free from abnormalities such as watermarks, creases, and wrinkles.

Conditioning

Tests for smoothness shall be made on specimens which have been conditioned according to TAPPI Standard T 402 m and the tests shall be made under the atmospheric conditions there prescribed.

I. Bekk Smoothness

APPARATUS

The testing instrument shall consist of:

1. An anvil having a circular, optically plane, glass surface with a circular aperture through the center by which air is conducted to a vacuum changer. The effective area of the surface shall be 10 ± 0.05 sq. cm., corresponding to a circular diameter of $3.57 + 0.01$ cm.
2. A 2-inch square pad of soft rubber with smooth surfaces.
3. A pressure plate and a means of applying a pressure of 1 kg. per sq. cm. through this plate to the effective area of the anvil.
4. Means for passing a volume of 10 ml. of air between the test surface of the paper sample and the plane, glass surface.
5. Means for measuring the time required for 10 ml. of air to pass between the two surfaces when a vacuum of approximately 370 mm. is applied.
6. A stop watch.

Adjustment and Calibration

Check the instrument frequently for leakage. By means of a vacuum pump, raise the mercury level to 500 mm., turn the stopcock to the closed or "O" position, and let the instrument remain in this state for at least 5 hours. If the drop in the mercury column is over 5 mm., tighten all gaskets. If air leakage continues, remove the stopcocks and the regulating valve pin, clean them and apply a thin film of stopcock grease to the polished surfaces. Make certain that the nut holding the glass block in place is tight.

It is particularly important that the capillary be kept clean. A jerky movement of the mercury column or adherence of the mercury to the glass is an indication that the capillary is dirty. In this case carefully remove and clean the capillary by washing it alternately with nitric acid and a solution of potassium bichromate in concentrated sulphuric acid. Remove all the cleaning solution by flushing with distilled water and several rinsings of alcohol. (Do not use ether). Dry the tube thoroughly by letting it stand in a warm room or by blowing filtered warm air through it. The mercury and reservoir should be cleaned at the same time. Before inserting the capillary, it is recommended that a layer, approximately 2 mm. in height, of pure benzyl salicylate be poured on top of the mercury in the reservoir to lubricate the capillary walls.

Whenever the instrument is not being used, protect the polished glass surface with a dust cap. Keep the surface of this block and the rubber pad clean at all times. Handle the rubber pad by the edges to prevent grease from finger tips accumulating on the surface of the pad. When not in use, store the rubber pads in a tightly covered container with a small amount of caron tetrachloride (CCl_4) in the bottom. The fumes of the CCl_4 keep the rubber "alive" and soft even after the liquid itself has evaporated. The pad should not touch the CCl_4 in the container but should be cleaned at frequent intervals with CCl_4 to remove dirt and grease accumulated on the surface. When the pad becomes hard, discard it.

TEST SPECIMENS

At least ten specimens, not less than 2 inches square, are required for each test.

PROCEDURE

Set the stopcock of the tester to position "p". With gentle strokes of the vacuum pump, raise the mercury column to slightly above 380 mm. and turn the stopcock to position "O".

For each test, place the specimen with the side to be tested in contact with thepolished glass surface. Lay the rubber pad on the paper and on top of this center the metal pressure disk. Bring the pressure bar down to a horizontal position, so that the leveling screw rests on the bore in the center of the metal disk. With the aid of the spirit level, and by means of the leveling screw, bring the pressure bar to level position. Turn the stopcock to position "M", and with a gentle pulling-turning motion of the fine regulating vent at the base of the air chamber, permit the mercury column to drop to approximately 380 mm. Just before the mercury column reaches 380 mm. close the fine adjustment vent with a firm pushing-turning motion. At the instant the 380-mm. mark is reached, start the stop watch and note the time required in seconds for the mercury column to drop from 380 to 360 mm. This figure represents the time necessary for 10 ml. of air to pass between the plane surface and that of the test specimen and is a numerical measure of the smoothness of the sample. Before removing the paper, turn the stopcock back to the "O" position.

If the time required for the 20-mm. drop is over 300 seconds, turn the stopcock to the 1/10 position, repeat the test on a separate specimen, and multiply the observed time, for the 20-mm. drop, by 10.

Use separate specimens for each test, since the pressure on the test specimen compresses the fibers in the sample. At least five specimens shall be tested on the wire side and on the felt side, respectively.

REPORT

Results shall be reported in seconds to two significant figures as Bekk Smoothness and shall include the num-

* This method is suggested by the Graphic Arts Committee as being the most suitable to date for its purpose. It is not, however, a TAPPI standard. Criticisms are earnestly requested and should be sent to R. G. Macdonald, Secretary, Technical Association of the Pulp and Paper Industry, 122 E. 42nd St., New York 17, N. Y.

ber of tests and the average, maximum and minimum results for each side of the paper.

II. Gurley-Hill S-P-S Smoothness

Apparatus

The testing instrument shall consist of:

1. A pair of optically flat, circular clamping plates having an effective area of 1±0.005 sq. in. The upper plate shall be fixed to the outlet of an air tube, and the lower plate shall be supported at its center upon a round-headed pin, and shall be arranged to clamp the paper sample under a pressure of approximately 3 p.s.i. by means of an unweighted lever arm.

2. Air pressure for the test shall be provided by an inner cylinder having a closed top, which slides freely in an outer cylinder filled to a depth of approximately 5 inches with mineral oil (viscosity 65±5 seconds Saybolt at 100°F.). Air shall be conducted to the clamping plates through a tube extending above the surface of the oil within the inner cylinder.

3. The outer cylinder shall be approximately 10 inches in height by 3.25 inches in diameter. Four bars, each approximately 7.5 inches in length, 0.12 inch in width, and 0.06 inch in thickness, shall be mounted vertically and equidistantly on the inner surface of the outer cylinder to act as guide tracks for the movable cylinder.

4. The movable cylinder shall be graduated in units of 50 ml. and shall have a total range of 350 ml. It shall be 10 inches in height and shall have an external diameter of 3.00 inches and an internal diameter of 2.90 inches. It shall weight 567±0.5 grams, producing an air pressure equal to 4.89 inches of water.

5. A support shall be provided on the outer cylinder to hold the inner cylinder in a raised position prior to making a test.

Calibration

The apparatus shall be tested for air leakage by clamping the clamping plates in the normal manner after their contact surfaces have been thoroughly cleaned by a solvent. The inner cylinder shall then be released so that it floats in the same manner as when making a test, and the air leakage shall not exceed 60 ml. in 5 hours.

Note: If a greater leakage occurs, tighten all joints and examine the clamping plate for scratches or dents. Any damaged instrument will not give true readings and should be repaired.

Test Specimens

Each test specimen shall consist of 8 thicknesses of the sample, each not less than 2 inches square, arranged so that all the felt and all wire sides are respectively in contact with each other. A single sheet folded to give 8 thicknesses may be used. In cases of extremely high or low smoothness, it may be convenient to use a greater or lesser number of thicknesses of paper for the test specimen.

Procedure

Place the apparatus on a level surface. Insert the prepared specimen in the punch on the base of the apparatus, and in the center of the pad punch a hole. Raise the inner cylinder until it rests on the support. Insert the punched specimen between the upper and lower clamping plates so that the hole is centered in the clamps. Adjust the lower plate until the lift produced by the lever arm is sufficient to clamp the sample securely. Lower the lever arm by means of the handle which actuates the lifting cam. The specimen is now clamped for test.

Gently lower the inner cylinder until it floats in the oil. When a steady downward movement has been reached, measured by a stopwatch or an automatic timing attachment the number of second required for any two consecutive 50-ml. intervals to pass the rim of the outer cylinder, or for greater or smaller volumes if the finish of the sample makes this advisable.

Precautions should be taken to avoid subjecting the apparatus to vibration as this increases the rate of air displacement.

Report

Results shall be reported as Gurley-Hill S-P-S Smoothness and shall be the number of seconds required for 50 ml. of air to pass between the test surfaces of the test sample. The average, maximum and minimum of ten tests shall be reported to two significant figures.

III. Williams Smoothness

Apparatus

The apparatus shall consist of:

1. A clamping device having an upper jaw with soft rubber-facing, and the lower jaw an annular ring having a 2-inch outside diameter and with a hole in the center 1±0.005 inch in diameter.

2. Means for applying a clamping pressure of 30 pounds per square inch to the area to be tested.

3. Means for passing a volume of 25 ml. of air between the two surfaces to the test specimen. The air supply is obtained by forcing a cylinder, open at the lower end, down to a fixed stop into a reservoir of mercury. The enclosed air is conducted to the sample by means of a pipe entering the movable cylinder. The movable cylinder is provided with a friction ring which holds it in position when it has been forced down to its lowest point.

4. An automatic electric stop clock to measure the time required for a definite quantity of air to pass between the two surfaces of the clamped specimen. The depression of the movable tube encloses a definite quantity of air at a definite pressure and elevates the surface of the mercury in the surrounding cistern up to and beyond an electric contact point. The mercury upon reaching the contact point starts the electric stop clock. As the air pressure is relieved, the level of the mercury gradually falls until it comes below the contact point. This breaks the circuit, stopping the electric clock. The timing of the test is automatic.

5. A standard stainless steel test plate having an accurate and fixed rate of air escapement.

Adjustment and Calibration

The apparatus shall be tested frequently for air leaks by inserting the test plate, with blank side down, into the sample holder, and making a blank test for a period of 5 hours.

If there appears to be a leak, check the following points:

1. Air passing beneath the lower rubber facing and the sample holder indicates a breakdown of the cement at this place. If this happens and the rubber is still in good condition, reseal the facing.

2. Air passing between the test block and the rubber indicates a hard, cracked, or otherwise defective surface. If this happens, a new facing should be inserted.

3. Leakage at the joint between the bottom of the sample holder with the base plate or the small plug directly below, in the base plate, can be detected by applying a soap solution to the defective points and watching for indications of escaping air.

4. Leakage at the knurled cap screwed onto the top of the central movable column may be detected by

submerging the knurled end in water and applying air pressure at the open end.

Note: U. S. Royal Super Rim Cement may be used to cement the rubber facings to the sample holder. It may also be used for sealing leaks in the metal joints. Warming the metal parts and applying beeswax will also give satisfactory results.

TEST SPECIMENS

At least ten test specimens are required, each folded on itself. The minimum dimension when folded shall be not less than 2 inches.

PROCEDURE

Raise the movable column to its highest point. See that the electric stop clock is set at zero. Insert the folded sample, perforated with an ⅛-inch round hole in the center of the lower folded square, between the clamping plates. Screw down the upper clamp until the gage indicates 30 p.s.i. Force down the movable column to the fixed stopping point. This operation starts the clock. The test requires no further attention as the clock automatically stops when the test is completed.

REPORT

Test results shall be reported to two significant figures as Williams Smoothness and shall be the average, maximum and minimum of 10 tests in terms of seconds for the passage of 25 ml. of air over the surfaces of the test specimens.

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TAPPI Notes

John C. Plankinton, formerly of the Crown Zellerbach Corporation is now technical supervisor for the Western Waxed Paper Company, Oakland, Calif.

George B. Hughey, formerly of the West Virginia Pulp and Paper Company is now research chemical engineer for Merck & Company, Inc., Rahway, N. J.

Frank G. Calkin, formerly of Finch Telecommunications is now with the Okonite Chemical Company, 30 Rockefeller Plaza, New York, N. Y.

Robert L. Norton, Jr., formerly of Doubleday & Company is now research chemist for the Monsanto Chemical Company, Unit 3, Dayton, Ohio.

Francis T. Ratliffe, formerly of the Institute of Paper Chemistry is now chemist for the Johns-Manville Corporation, Manville, N. J.

Clifford B. Pape, formerly of the Valley Research Corporation, is now research director for Convertor Products, Dominion Foils of Canada Ltd., Montreal, P. Q.

A. B. Layton has succeeded Louis Blach as the official representative of the Crown Zellerbach Corporation in the Technical Association.

Karl E. Kretlow, formerly of the Pollock Paper & Box Company, is now chief chemist for Wortendyke Mfg. Company, Richmond 13, Va.

J. C. Hitchman, formerly of the E. B. Eddy Company, is now with Provincial Paper Ltd., Port Arthur, Ont.

R. W. Alten, formerly of A. S. Rowal Thv. Meyersgt, is now managing director of Ferrum Montage A. S., Klingenbergget 4, Oslo, Norway.

New TAPPI Members

The Executive Committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

George E. Lamb, Partner, Lamb-Grays Harbor Co., Hoquiam, Washington, a 1923 graduate of Washington State College.

Carl A. Malm, Assistant Plant Chemist, British Columbia Pulp & Paper Co. Ltd., Woodfibre, B. C., Canada, a 1931 graduate of the University of British Columbia.

Walter E. Spearin, Student, Institute of Paper Chemistry, Appleton, Wisconsin, a 1943 graduate of the University of Maine.

Roswell F. Taylor, Watertown, New York, a 1926 graduate of Yale University, with an LL.B. degree from Cornell University in 1929.

Chin-chang Yang, Superintendent, Taiwan Paper Co., Taipeh, Formosa, China, a 1940 graduate of National North West University.

Nelson S. Benzing, Technical Adviser to Mill Manager, Champion Paper & Fibre Co., Hamilton, Ohio, a 1932 graduate of Renssalaer Polytechnic Institute.

Bror A. Bygden, Mill Manager, Anjala Paper Mills, Inkeroinen, Finland, a 1924 graduate of Friedrichs Polytechnikum, Germany.

Sidney C. Friedman, Engineer, P. J. Kennedy & Co., Holyoke, Massachusetts, a 1928 graduate of Columbia College, and a 1932 graduate of Massachusetts Institute of Technology.

John C. C. Gain, Control Chemist, Abitibi Power & Paper Co. Ltd., Sturgeon Falls, Ontario, Canada, a 1946 graduate of the University of Toronto.

Fred J. Giffen, Assistant to Manager of Manufacturing, Canadian International Paper Co., Montreal, P. Q., Canada, a 1928 graduate of the University of Toronto.

Wesley P. Heilman, District Sales Manager, S. D. Warren Co., New York, New York, a 1921 graduate of Northwestern University.

Theodore E. Kloss, General Superintendent, Ryegate Paper Co., East Ryegate, Vermont, a 1917 graduate of Worcester Polytechnic Institute, and a 1922 graduate of the University of Maine.

Harold J. LeBeck, Sales Engineer, Jos. T. Ryerson & Son, Inc., Philadelphia, Pennsylvania, a 1936 graduate of Pratt Institute.

Birger A. Maase, President and Manager, Pulp & Paper Mill Accessories Ltd., Montreal, P. Q., Canada.

Hei Pa Wong, Graduate Student, University of Washington, a 1944 graduate of National Kwangsi University, China.

Ernest G. Pallister, Resident Engineer, Provincial Paper Ltd., Port Arthur, Ontario, Canada, a 1938 graduate of Queens University.

Daniel T. Quirk, Vice-President, Peninsular Paper Co., Ypsilanti, Michigan. Attended the University of Michigan.

Dewitt F. Sampson, Assistant Manager of Research, Pacific Division, American Can Co., San Francisco 7, California, a 1927 graduate of Iowa State College.

Howard K. Sheldon, Research Chemist, Marathon Corporation, Rothschild, Wisconsin, a 1935 graduate of Lawrence College.

Atma Singh, Engineer, Jaswant Sugar and Strawboard Mills Ltd., Meerut City, India, a graduate of Benares Hindu University.

Caleb S. Taft, Draftsman, International Paper Co., Niagara Falls, New York, a 1944 graduate of Massachusetts Institute of Technology.

Julian H. Toulouse, Chief Engineer, Owens-Illinois Glass Co., Toledo 1, Ohio, a 1926 graduate of Iowa State College, with a Ph.D. degree in 1929.

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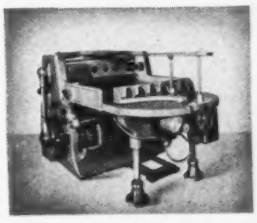

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